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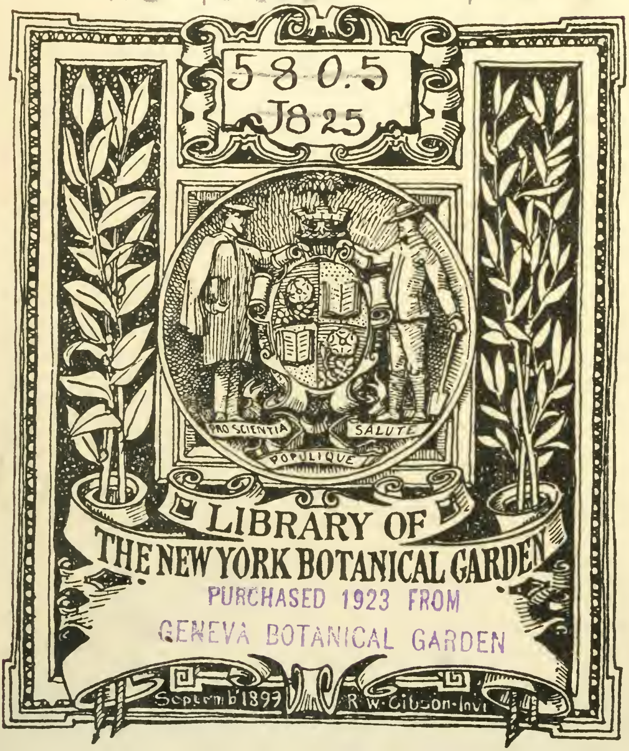
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BRITISH AND FOREIGN.

EDITED BY

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VOL. XXXVI.

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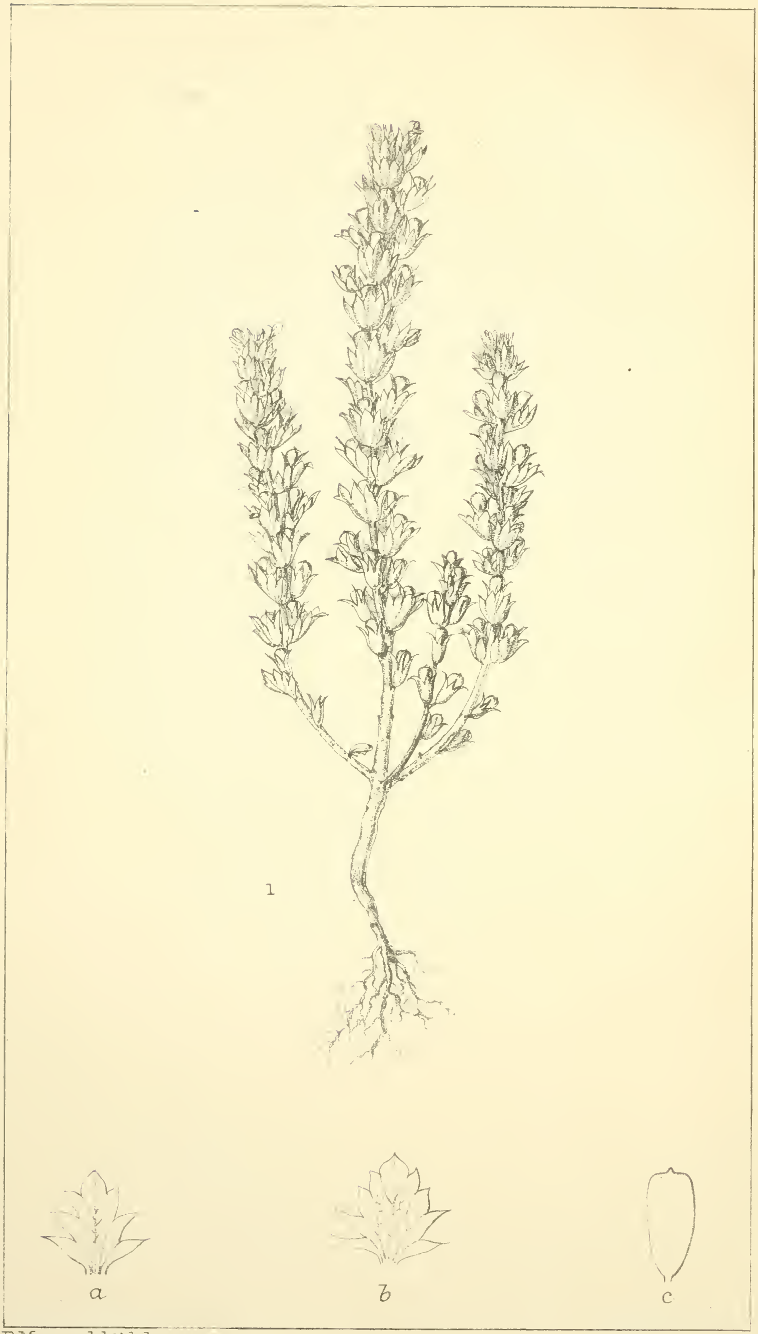
Directions to Binder.

Tab. 381	to face page 1
,, 382	,, 41
,, 383	,, 73
,, 384	,, 209
,, 385	,, 113
,, 386	,, 161
,, 387	,, 241
Tabs. 388, 389	,, 289
Tab. 390	,, 329
Tabs. 391, 392	,, 409
Tab. 393	,, 465

Or all may be placed together at the end of the volume.



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Euphrasia Canadensis *nov. sp.*

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EUPHRASIA CANADENSIS, NOV. SP.

By Frederick Townsend, M.A., F.L.S.

(Plate 381.)

Caulis erectus, *in parte inferiore ramosus*, ad 13 cm. altus, viridis vel rubescens, pilis crispulis albidis reversis obsitus, ramis paucis oppositis erectis elongatis simplicibus. Folia oblonga cuneata obtusa, inferiora dentibus obtusis, superiora *dentibus infimis aristatis*. Bracteæ suboppositæ erecto-patentes, latitudine folia caulina superantes, ovatæ breviter acuminatæ, in parte inferiore latissimæ, utrinque dentibus 5, *dentibus superioribus acutis; inferioribus in aristam rectam prolongatis*, bracteæ summæ basi cuneatæ. Folia omnia viridia, fere glabra sed in regione marginali et in pagina superiore et inferiore setulis minutissimis sparsis *et in pagina inferiore pilis paucis glanduliferis brevibus intermixtis obsita*. Spica initio condensata, mox valde elongata et condensata. Calyx dentibus late triangulari-lanceolatis aristatis subpatentibus, *fructifer accretus*, in margine et in nervis setulis parvis obsitus. Corolla parva alba ?, 7 mill. longa, tubo brevi, labio superiore bilobo, lobis emarginatis aut erosis, labio inferiore trilobo, lobis subæqualibus emarginatis. Capsula oblongo-obovata truncata vel subemarginata mucronata, mucrone capsulam superante, in parte superiore setulis minimis sparsis obsita et in margine sparse ciliata, calycis dentes æquans vel superans, bracteam subæquans vel superans.

In collibus graminosis prope Quebec. Aug., Sept.

I gathered this *Euphrasia* in 1891, and, being new to me, I provisionally named it, but for various reasons it has until lately remained neglected in my herbarium. I now take the opportunity of recording and describing it, as I still think it distinct; and I believe Prof. Wettstein inclines to the same opinion, though he may reserve his final judgment.

AUG 7 - 1923

I only know *Euphrasia americana* Wetts. from Prof. Wettstein's description and figure in his monograph of the genus. It is described as a slender plant branching from the middle and above it, its bracts with a cuneate base, without glandular hairs, and the lower teeth aristate; the flower-spikes neither dense nor elongated.

Among European species *E. canadensis* has somewhat the habit of *E. stricta* Host = *E. ericetorum* Jord., from which it differs by the branches being confined to the lower portion of the stem, by its opposite and glandular bracts with fewer teeth, the upper teeth being less acute and not aristate, by the capsule being broader at the apex and truncate and exceeding the calyx-teeth, &c.

E. Canadensis differs from *E. borealis* Towns., in which the branches are not confined to the lower portion of the stem, and they are erect-patent and not so prolonged, the teeth of its leaves and bracts are less acute, and its capsule is decidedly emarginate.

As to the history of *E. canadensis*, it is difficult to form an opinion without further knowledge of its present geographical distribution; whether it be an importation from Europe at a remote though historic period, modified by climatic or other influences, or whether it be the descendant of an ancient but indigenous form. As regards *E. americana* Wetts., Prof. Wettstein inclines to the idea of importation, as stated in his Monograph, p. 128.

DESCRIPTION OF PLATE 381.

1. *Euphrasia canadensis*, nov. sp., nat. size.
   - *a.* Uppermost leaf. } All enlarged.
   - *b.* Lowest bract. } All enlarged.
   - *c.* Capsule. } All enlarged.

NEW SOMALILAND POLYPETALÆ.

BY EDMUND G. BAKER, F.L.S.

Mathiola dimolehensis, sp. n. Herba basi lignosa omnino cinereo-pubescens vel subtomentosa, foliis ellipticis vel oblanceolatis, apice acutis, lamina in petiolum decurrente, margine integerrimis subsinuatis vel obsolete sinuato-dentatis, pedunculis axillaribus solitariis erecto-patentibus et apicem versus aggregatis, sepalis cinereo-tomentosis vel sublanatis, petalis late obovatis in unguem longam attenuatis (in statu sicco purpureis), stylo brevissimo, filamentis liberis, siliquis teretibus vel obtuse subquadrangnlaribus, valvis crassiusculis intus transverse septatis quam siliquis *M. ellipticæ* R. Br. multo brevioribus, circiter 6–8-spermis, seminibus pallide brunneis.

Hab. Somaliland, Wagga Mountains, *Mrs. E. Lort Phillips.* Dimoleh, *Messrs. Gillett & Aylmer.*

Closely allied to *M. elliptica* R. Br., and, like that plant, a diffuse or bushy herb, woody below, with branches, leaves, &c., covered with a close cinereous or hoary tomentum. Leaves elliptical or oblanceolate, apex acute, margin entire or obscurely sinuate-dentate, lamina at the base narrowing gradually to bottom of petioles, lamina measured from point of insertion of petioles 2–2¾ in. long, breadth at broadest point ⅔–⅚ in. Pedicels short, erect, covered with hoary tomentum, axillary and solitary, but crowded near apex. Sepals with rather more woolly tomentum than in *M. elliptica.* Filaments not joined. Style very short; stigmas converging, forming a triangular tip to the ovary. Petals broadly rotund, obovate, gradually narrowing into rather a long claw (pinkish purple when dried), rather more than 1 in. long. Capsule about ⅓ in. long (perhaps not quite ripe), covered with rather stiff hairs somewhat similar to those on capsule of *Papaver hybridum* L., about 6–8-seeded.

This plant differs from *M. elliptica* R. Br. more particularly in the capsule, which is, as has just been stated, stiffly hirsute, not covered with a close tomentum, much shorter, and much fewer-seeded.

Prof. Oliver (Fl. Trop. Africa, i. 57) states that the ripe siliqua of *M. elliptica* R. Br. had not then been seen. Specimens of this plant are also in the collection from Wagga Mts., Boresti, and Dimoleh; the ripe siliqua attains a length of 2½ to rather more than 3 in. long.

Mathiola dimolehensis differs from *Morettia Revoili* Franchet, Sert. Somal. 10, t. 1 (in Révoile, *Faune et Flore des Pays Comalis,* 1882), by the capsule being fewer-seeded, and by the shape of the petals being not so cuneate. Another allied plant is *Mathiola Smithii* Bak. fil. in Journ. Bot. 1896, 50, which differs in its strongly bicusped capsule.

Melhania somalensis, sp. n. Caulis tenuis teres ramosus tenuiter stellatim cano-pubescens demum glabratus, ramulis teretibus superne (an exsiccatione tantum?) complanatis, foliis modice petiolatis lanceolatis vel oblongo-lanceolatis, basi rotundatis vel subcordatis serratis utrinque cano-pubescentibus subtus pallidioribus, stipulis subulatis quam petiolis subduplo brevioribus, floribus axillaribus, pedunculis solitariis unifloris, bracteis linearibus quam calyce subduplo brevioribus demum reflexis, sepalis lanceolatis externe cano-pubescentibus valde acuminatis, petalis subæquilongis, capsula columnari externe cano-pubescente, loculis 4–8-spermis.

Hab. Somaliland. Sheikhusin, *Dr. Donaldson Smith.* In flower and fruit Sept. 1894. No. 152.

Wiry, probably annual, scarcely woody at the base, erect, branched, 1 ft. (possibly more) high, branches ascending, especially towards the extremities, cano-stellately pubescent, and somewhat flattened. Leaves lanceolate or oblong-lanceolate, often about 1½ in. long, 5 lines broad, rounded at the base, serrate, covered with a close tomentum above and below, greenish above, lighter-coloured below; petiole 4 lines long. Stipules subulate. Flowers axillary, peduncle rather over ½ in. long. Bracts linear-lanceolate, about half as long as sepals. Sepals very acuminate, externally cano-pubescent. Capsule columnar, cano-pubescent externally, not pointed at the top, ⅓ in. high. Loculi 4–8-seeded, seeds somewhat angular.

This plant may be easily recognized by the narrow bracts, the very acuminate sepals, the leaves 3–4 times longer than broad, and the carpels with 4–8 seeds in each loculus.

Melhania Phillipsiæ, sp. n. Suffrutex erectus, caule dense flavescenti-tomentoso, foliis ellipticis vel ovatis modice petiolatis utrinque tomentosis mollibus, margine serratis, basi subcordatis, apice obtusis, stipulis subulatis quam petiolis subtriplo brevioribus, pedunculis axillaribus sæpissime 3-floris, pedicellis quam pedunculis brevioribus, bracteis reniformibus acutis vel breviter acuminatis, post anthesin accrescentibus et scariosis reticulato-venosis, sepalis anguste ovato-lanceolatis concavis quam capsula longioribus, petalis in statu sicco flavis, capsula globosa 5-loculari externe stellato-hirsuta, loculis 2-3-spermis, seminibus angulatis pubescentibus.

Hab. Somaliland. Soksoda and Wagga Mts., *Mrs. E. Lort Phillips.*

This plant is suffruticose erect, stem covered with a velvety-flavescent tomentum. Leaves elliptical or oval, margin irregularly serrate, base subcordate, both sides tomentose, under side lighter-coloured, lamina 1½–2½ in. long, 1⅓–2 in. broad, petiole ⅔ to rather over 1 in. long. Stipules linear, often about 4 lines long. Peduncles axillary, ½–¾ in. long, generally 3-flowered, pedicels shorter than peduncles, ⅓ to nearly ½ in. long, both peduncles and pedicels hairy. Bracts reniform, acute or shortly acuminate, tomentose when young, enlarging much in fruiting stage, becoming scarious, reticulate-veined. Sepals 5, lanceolate, concave, externally covered with white hairs, longer than capsule. Petals yellow when dried, about 5 lines long. Capsule globose, stellately hairy externally, about 4 lines high, not pointed. Loculi 2–3-seeded; seeds angular, pubescent.

Allied to *M. Forbesii* Planchon.

It seems advisable to give a list of the Tropical African species of *Melhania*, much having been added since the publication of the *Flora of Tropical Africa*, especially in regard to Somaliland, which was at that time comparatively unexplored.

TROPICAL AFRICAN SPECIES OF MELHANIA.

A. Bracts reniform. Loculi 1–2-seeded. Stem and leaves covered with a close cinereous tomentum (in *M. Denhami* R. Br. var. *grandibracteata* K. Schum. it is very soft).

1. M. DENHAMI R. Br. in Denh. Clapp. Trav. App. 233.

Hab. Senegambia; Kordofan; Mozambique District; Somaliland (*fide* K. Schum.); also occurs in Arabia and Scinde.

Var. GRANDIBRACTEATA K. Schum. in Ann. Ist. Roma, vii. 34.

Hab. Somaliland, near Menehan; *Riva*, Nos. 440, 441 (*fide* K. Schum.).

2. M. MURICATA Balf. fil. in Proc. Roy. Soc. Edin. xi. (1882), 503, tab. vii. A.

Hab. Somaliland. Wagga Mts., *Mrs. E. Lort Phillips.* Originally described from Socotra.

B. Bracts reniform. Loculi 2–3-seeded. Leaves clothed with a soft velvety more or less flavescent tomentum.

3. M. PHILLIPSIÆ Bak. fil.

Hab. Somaliland. Soksoda and Wagga Mts., *Mrs. E. Lort Phillips.*

C. Bracts broadly ovate or ovate, often very acuminate.
Loculi 2–∞-seeded.

4. M. FERRUGINEA A. Richard, Fl. Abyss. i. 76.

Hab. Nile Land; Mozambique District; Lower Guinea; also collected in Somaliland by *Mrs. E. Lort Phillips.*

Probably identical with *M. velutina* Forsk., in which case this name must take precedence.

5. M. ACUMINATA Masters in Oliver, Fl. Trop. Afr. i. 231.

Hab. Mozambique District. Occurs also in Matabele Country.

6. M. FORBESII Planchon ex Masters, *l. c.*

Hab. Mozambique District; Lower Guinea. Recorded also from Omatope, in Amboland (*fide* H. Schinz).

7. M. STEUDNERI Schweinf. in Verh. Zool. Bot. Wien (1868), 672.

Hab. Nile Land. Bogos, *Steudner*, No. 1162.

D. Bracts lanceolate. Loculi 2–∞-seeded.

8. M. INCANA Heyne ex Wall. List, No. 1200 (1828), var. ALBIFLORA Hiern, Welw. Cat. 88.

Hab. Lower Guinea, Mossamedes.

9. M. CYCLOPHYLLA Hochst. ex Masters, *l. c.*

Hab. Abyssinia, *Schimper.*

10. M. ROTUNDATA Hochst. ex Masters, *l. c.*

Hab. Abyssinia, *Schimper.*

E. Bracts linear, subulate. Loculi 2–∞-seeded.
Leaves oval, obtuse.

11. M. ABYSSINICA A. Rich. Fl. Abyss. i. 76, t. 18.

Hab. Nile Land; Somaliland. Occurs in the Cape Verde Islands, also in Scinde.

F. Bracts linear, subulate. Loculi 2–∞-seeded.
* Leaves lanceolate or oblong-lanceolate.

12. M. SOMALENSIS Bak. fil.

Hab. Somaliland. Sheikhusin, *Dr. Donaldson Smith.*

* * Leaves oblong elliptical?

13. M. GRIQUENSIS Bolus, var. β VIRESCENS K. Schum. in Bot. Verh. Brand. (1888), 230.

Hab. Hereroland, *Lüderitz.*

I have not had an opportunity of dissecting this plant; the position therefore is doubtful.

M. griquensis Bolus is apparently identical with *M. Rehmanni* Szyl.

G. Bracts linear. Loculi 1-seeded.
Leaves oblong, orbicular or orbicular-ovate.

14. M. ENGLERIANA K. Schum. in Engler, Hochgebirgsflora, 303.

Hab. Somaliland. Ahlgebirge, *Hildebrandt*, No. 834 c.

Kelleronia Gillettii, sp. n. Fruticosa ramosa, ramulis herbaceis vel suffrutescentibus strigoso-pubescentibus, foliis petiolatis paripinnatis sæpissime 4-jugis, foliolis oblique oblongis vel ovato-oblongis vel subellipticis brevissime petiolatis præcipue subtus strigoso-pubescentibus, apice rotundatis vel brevissime mucronatis, stipulis anguste lanceolatis, floribus axillaribus solitariis, pedunculis quam foliis sæpissime brevioribus, alabastris acuminatis, sepalis lanceolatis acuminatissimis, basi saccatis quam petalis subduplo brevioribus, petalis "coccineis" obovatis, carpellis 5 reticulatis sparse pilosis.

Hab. Somaliland. Somali name, "Obach." "Straggling bush among rocks, below quite woody." In flower January, 1897, *Miss Gillett*. Wagga Mountains, *Mrs. E. Lort Phillips*.

A straggling bush, woody below; branchlets herbaceous or suffrutescent, striate, pubescent. Leaves paripinnate, generally about four pairs of leaflets. Leaflets obliquely oblong or ovate-oblong, apex subacute, very shortly petiolate, strigosely hairy, especially below, about ⅔ in. long and 4–5 lines (rarely reaching 7 lines) broad. Stipules lanceolate. Flowers axillary, solitary, peduncles ⅔–¾ in. long. Buds very acuminate, externally hairy. Sepals lanceolate, very acuminate, hairy on the back, margin scarious, about half as long as the petals. Petals "scarlet," about 1¼ in. long. Stamens shorter than the style. Ovary densely hairy. Style about ⅔ in. long. Carpels 5, adhering to central axis, otherwise free, reticulate, sparsely pilose, about ½ in. long.

Closely allied to *Kelleronia splendens* Schinz, in Bull. Herb. Boissier, 1895, 400, t. 9. This plant has lemon-yellow flowers, while in the present species they are scarlet. The internodes in *K. Gillettii* are much longer (*i. e.* 1½–2½ in. long), the branchlets thinner, and the leaflets not quite so pointed and more inclined to be obliquely oblong-ovate than simply ovate, but in shape they are subject to considerable variation.

TWO NEW FORMS OF HIERACIUM.

By the Rev. Augustin Ley.

Hieracium hypochœroides Gibs. var. Cyathis, nov. var. Original root-leaves obovate, retuse at tip, the base gradually narrowed into petiole, strongly fringed with white hairs which also cover the under surface. Inner leaves much produced, blade 4–5 in. long, oval, elliptic or narrowly elliptic, acute, often toothed. Stem stout, stiff, 1 ft. to 18 in. high, with scattered lax, white hairs, often branched; peduncles at the top stiffly spreading. Phyllaries with recurved tips in bud; bud short, forming from the first an open cup, and showing the tips of the immature ligules within the cup. Leaves green or slightly marbled; styles pure yellow.

In addition to the remarkably different shape of the leaves, the shorter bud, which is open from the earliest stages, like a miniature cup (hence the varietal name), and the phyllaries with tips recurved in bud, distinguish this plant from both typical *H. hypochæroides* and the var. *saxorum*. In both the latter the phyllaries are porrect in bud. The outer phyllaries of the present plant are also much laxer in early bud, and the stem has more numerous white hairs than in the type or in var. *saxorum*. The tint of the leaves is of a lighter green than in the type, but agrees with that of the var. *saxorum*.

Plentiful on a range of limestone rocks near Merthyr Tydfil, S. Breconshire, in company with the variety of *H. pollinarium* F. J. Hanb. described below. First noticed in 1894; gathered also in subsequent years, and watched in cultivation.

Though hitherto detected only at a single station, this plant seems remarkable enough to deserve recognition and description under a varietal name. I have Mr. Hanbury's consent to placing it under *H. hypochæroides* Gibs.

HIERACIUM POLLINARIUM F. J. Hanb. var. PLATYPHYLLUM, nov. var. Radical leaves large, broadly ovate, often with triangular teeth near the base; the teeth and the point of the leaf terminating in an apiculus, thick and firm in texture when fresh, the under surface with minute stellate down. Stem with 1–2 leaves, 9 in.–2ft. in height, with long erect branches; the branches, and especially the very floccose peduncles, forming a very acute angle with the stem; phyllaries with strongly marked floccose margins, incurved at tip in bud, as in *H. murorum* L. pt.; ligules mostly but not always stylose, styles dark olive-green.

Differs from type *H. pollinarium* F. J. Hanb. in the phyllaries being more parallel-sided, with more black-based hairs and floccum; in the more floccose and less setose, longer, straighter peduncles, which form a very acute angle with each other and with the stem; in the leaves not being retuse at tip, nor narrowed to the base, but broad-based, with coarse, somewhat sagittate teeth.

Mountain rocks, both of sandstone and limestone; frequent in parts of South Wales, especially in Breconshire.

Localities:—Herefordshire: Red Daren, Hatterel range, Black Mountains. Monmouthshire: Taren-r'-Esgob, Llanthony Valley, Black Mountains. Breconshire: frequent on the cliffs of the Black Mountains, near the above stations in Herefordshire and Monmouthshire. Frequent on the Brecon Beacon range; Craig Gledsiau and Craig Du (all the above stations on sandstone); Craig Cille, near Crickhowel; Dyffryn Crawnon; Dan-y-graig and other spots near Merthyr Tydfil (all these on limestone). Probably found on the more western portions of this range in Carmarthenshire.

First observed at the Herefordshire station in 1892, and at several of its Breconshire stations in 1893. I have watched it under cultivation since 1893, in the light loam of a South Herefordshire garden. Here it retains all its characteristics, but becomes more robust, the crowns of the root increase in size, and throw up a greater number of stems. It increases rapidly by seed in the garden. The stylose ligules occur in about five out of six specimens, whether in a cultivated or wild state, but this character does not appear to be accompanied by any other variation in the plant.

ON PRIMARY CHARACTERS IN CERASTIUM.

By Frederic N. Williams, F.L.S.

In many important floras *Cerastium trigynum* Vill. is transferred to the genus *Stellaria* on account of the ovary bearing three styles, and when ripe dehiscing by six teeth. The presence of three styles instead of five is therefore in this case regarded as a generic character. An examination of specimens of many species shows, however, that this is an inconstant character, and is by no means to be relied on for separating *Cerastium* from *Stellaria*. The form of the ripe capsule as well as the direction and curvature of the teeth after dehiscence should together be taken as the cardinal character of *Cerastium* as distinct from *Stellaria:* the number of the styles and capsular teeth should not in this connection be taken into account.

Species of *Cerastium* may generally be distinguished from those of *Stellaria* and *Arenaria* by habit, although not always satisfactorily. At the same time, if the fruit-characters of a typical *Cerastium* be kept in view, there ought to be no difficulty in defining the genus and in circumscribing the species. As defined and aptly named by Linnæus it is characteristic enough. The form of the ripe capsule in three common species affords a ready illustration.

In *Cerastium triviale* the capsule lengthens considerably after the formation of seeds; it is then somewhat cylindrical in form, often more than twice as long as the calyx; in the process it curves like a horn, and dehisces by ten short straight teeth revolute at the margins. The ovary before fertilization of the ovules is ovate-globose, and scarcely longer than the calyx.

In *Stellaria Holostea* the ripe capsule is globose, about equal to the calyx in length, and after rupture the six teeth formed by dehiscence extend half down the capsule or beyond.

In *Arenaria serpyllifolia* the ripe capsule is ventricose-ovoid, equalling or slightly exceeding the calyx, and dehisces by six plane straight teeth not revolute at the margins; neither is the capsule so deeply cleft as in a *Stellaria*. In many species of *Cerastium* the capsule is straight, but the teeth are revolute at the margins as in *C. nemorale* Bieb., or else at the apex (circinate-convolute) as in *C. tomentosum* L.

Whether the capsular teeth are opposite the sepals or alternate with them is a more important character than the fact of the gynœcium being isomerous or meiomerous in relation to the segments of the calyx. There is therefore greater reason for keeping up the genus *Malachium* than for referring *Cerastium trigynum* to *Stellaria*, where it was first placed by Linnæus. The same character satisfactorily serves to distinguish *Spergula* from *Spergularia*. In *Spergula arvensis* L. the five valves of the capsule are opposite the sepals, and before dehiscence the five styles are alternate with the sepals. In *Spergularia rupicola* Lebel there are only three styles, but in *Spergularia grandis* Camb. the five styles are opposite the sepals, and the five valves of the capsule are alternate with the sepals.

The most characteristically defined group in *Cerastium* includes those species in which the teeth of the capsule after dehiscence are finally circinate-convolute. In none of the allied genera does this peculiarity in the capsular teeth occur. But it is to be noted that in all the species referable to this group the ripening capsule, while increasing in length, does not become curved, except in *C. Armeniacum*, where it is considerably curved, and more than half exserted from the calyx. If, without regard to the number of teeth (whether six or ten), those species in which the teeth are finally circinate-convolute are included in the group defined by Seringe as the section *Strephodon*, there only remain in the group defined by Bartling as the section *Dichodon* two well-known species, *C. trigynum* and *C. anomalum*. To these may, however, be added *C. mauritanicum* Pomel, and *C. melanandrum* Maxim.

Examination of the capsules of other species shows also that the number of styles in specimens is an inconstant character. A well-defined American species, *C. Texanum*, has been described by Dr. N. L. Britton in which the styles vary 3–5, but the capsular teeth are invariably circinate-convolute. The same obtains in *C. indicum* W. & Arn. In Wight's specimens I have noticed several ovaries with only three styles instead of five. Mr. Henry Trimen, in his *Flora of Ceylon*, says of the specimens which he examined, "Styles 5, not 3,[*] as given in the *Fl. of British India*." This is certainly not stated in *Fl. of British India*, i. p. 227. Again, in a Siberian species, *C. obtusifolium* Kar. & Kir., included in the section *Strephodon*,[†] I find on the examination of authentic specimens that there are only three styles, and that the six capsular teeth are subrevolute at the margin, and not circinate-convolute at the tip, but straight and obtuse: so that but for the form of the petals (should the character be sufficiently distinctive) the species might as well be reduced to a variety of *C. trigynum*.

It may further be pointed out that in *C. trigynum* and allied species the capsule is never curved, which serves with other characters taken into consideration to separate them from the large group of which *C. glomeratum* and *C. arvense* are well-known examples; a group in which the character of the 10-dentate capsule is normal and less inconstant.

In the matter of habit and aspect *Stellaria* includes slender, diffuse, glabrous herbs, while the species of *Cerastium* are pubescent, though *C. perfoliatum* L. is a conspicuous exception, and the perennial forms are often tufted. On the other hand, two species of *Arenaria* with long cylindrical capsules, viz. *A. Guicciardii* Heldr. and *A. purpurascens* Ramond, may be regarded as connecting links with the normally 3-styled species of *Cerastium*. In *Cerastium* the capsule may be said to be always more or less elongated, while in *Stellaria* and *Arenaria* it is characteristically ovoid or oblong.

An important character noted by Fenzl[‡] is that the seeds of some species are angular (in the dried state), from shrinking of the testa, owing to its not being closely adherent to the albumen, though somewhat inflated in fresh seeds. This character distinguishes *C. latifolium* from such a species as *C. arvense*, in which the nucleus is closely invested by the testa which is uniformly adherent to the albumen. Such seeds are not angular in the dried state. This character, however, is sometimes difficult to make out in small seeds, in which the dorsal curvature is less marked.

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[*] There is probably also an error in transposition of figures here.

[†] Ledeb. *Fl. Rossica*, i. 398.

[‡] Ledeb. *Fl. Rossica*, i. 415.

The species of *Cerastium* may be associated into primary groups on the basis of characters which have been relied on previously for the definition of sections, though of different grades in grouping. The subgenera of *Cerastium* are defined in accordance with the views expressed in these short notes.

Subgenus I. Dichodon.—Petala profunde emarginata. Styli 3. Capsula recta, dentibus 6 erectis vel patulis margine subrevolutis dehiscens.—Herbæ annuæ vel perennes.

Subgenus II. Strephodon. — Petala incisa vel emarginata. Styli 3 vel 5 (interdum 4). Capsula recta vel curvata, dentibus 6 vel 10 apice circinato-convolutis, margine non revolutis, dehiscens. —Herbæ annuæ vel perennes, dichotome ramosæ, multifloræ, rarius simplices, corymboso- vel subumbellatim cymosæ.

Subgenus III. Orthodon.—Petala incisa, emarginata, vel laciniata. Styli 5. Capsula recta (insuper interdum apice leviter curvula) vel plus minus e basi curvata, plerumque calyce longior, rarissime brevior; dentibus 10 erectis vel patulo-rectis, dorso planis vel margine revolutis, dehiscens.—Herbæ annuæ vel haud sæpius perennes, habitu et florum dispositione variæ.

THE FLORA OF WALES.

[In view of the increasing interest which is now being manifested in the botany of the Principality, it may be well to render accessible to British botanists the summary which was issued in August, 1896, as an Appendix (B) to the Report of the Royal Commission on Land in Wales and Monmouthshire.

It may be well to say that the Appendix was sent in proof by the Secretary of the Commission, Mr. D. Lleufer Thomas, to the Editor of this Journal, with a request that he would make such additions as were desirable. This he did at once, although at some inconvenience, as the matter was said to be urgent; and his very considerable additions were embodied in the published sketch. No acknowledgment whatever, however, is made of this help—an omission all the more remarkable inasmuch as Mr. Llenfer Thomas stated in one of his letters that he himself was "not very conversant in the literature of botany." That this is no exaggerated expression of modesty on Mr. Thomas's part is manifest from the list of plants (from Evans's *North Wales*) "almost exclusively confined" to the Principality, given on p. 30, which includes such species as *Jasione montana*, *Narthecium*, *Osmunda*, *Scilla verna*, *Campanula latifolia*, *Iberis nudicaulis* (there is no attempt to give modern synonymy), "the singular *dortmanna lobelia*," and "the surprising vegetable automaton the *ruppia maritima*." Even the generic names here have no capitals, but this is compensated for on p. 13 of the Appendix, where we find a "list of rare plants at present found in Wales" supplied by the Rev. O. M. Fielden, in which both generic and trivial names begin with a capital letter. This contains such names as "*Cerastium Alpinium*" and "*Aster Linocyris*," and indicates *Senecio campestris* among the plants "only found in Wales in the British Isles"!—Ed. Journ. Bot.]

The first professedly botanical tour in Wales was undertaken in the summer of 1639 by Thomas Johnson (ob. 1644), of Selby, Yorkshire. He was accompanied by Mr. Paul Sone and by Mr. Edward Morgan, who knew the Welsh language and was also a herbalist. Their tour was confined to North Wales, which they entered by way of Chester, and then journeyed by Flint, Holywell, and Penmaenmawr to Carnarvon, whence they ascended Snowdon. After visiting Anglesey they returned by way of Harlech, Barmouth, Machynlleth, and Montgomery, being entertained at the last-mentioned place by the first Lord Herbert of Cherbury. An account of this tour is given in the second part of Johnson's *Mercurius Botanicus*, which bore the title of "Mercurii Botanici Pars altera, sive Plantarum gratia suscepti Itineris in Cambriam seu Walliam Descriptio," Lond., 1641, 8vo, pp. 37.

This work was dedicated to Mr. Thomas Glyn, of Glynllifon, Carnarvonshire, himself a botanist, who is credited with having discovered the plant known as *Diotis maritima* on the Welsh coast, near his residence. This work together with other minor productions of Johnson were collected and edited by T. S. Ralph in 1847, under the title of *Opuscula Omnia Botanica Thomæ Johnsonii* (London, 4to).

In 1633 Johnson had brought out a new edition, considerably enlarged and extending to about 1650 pages, of Gerard's *Herbal* (which had been first issued in 1597), and a reprint of the new edition was also issued only three years later, in 1636.

The earliest book on botany restricted to the plants of Great Britain was William How's *Phytologia Britannica*, published anonymously in 1650. Several of the plants catalogued are described as found in Wales.

In the autumn of 1658 John Ray took a botanical journey, which he performed alone (and which was the first of his *Itineraries*) through the midland counties of England and the northern part of Wales. He left Chester (whither he had travelled from Cambridge) on August 25, and then followed almost exactly the same route as Johnson, nearly twenty years earlier. He quitted Welsh territory on the 7th of September, when he "rode through Welshpool to Shrewsbury."

In May and June, 1662, Ray, accompanied by his friend Willughby, made his third and most extensive tour (his second tour having been to Scotland and the North of England). The route followed was through the midland counties to Chester, as before, thence into North Wales, and, after making a circuit of the North Wales coast (visiting Anglesey and Bardsey), they followed the coast southwards as far as St. David's (ascending Plynlimmon on the way), and from St. David's to Gloucester, and thence through the south-western counties of Englsnd. In addition to the botanical notes, this third Itinerary gives much information concerning the Birds and Fishes, especially on the sea-coast of Pembrokeshire. These Itineraries have been published for the Ray Society under the title, *Memorials of John Ray*, edited by Edwin Lankester, London, 1846, 8vo (see the Welsh portions at pp. 127–130, and 166–178). Some of the results of these tours, so far as Wales is concerned, are also embodied in Ray's *Fasciculus Stirpium Britannicarum*, "post editum plantarum Angliæ Catalogum observatarum" (Lond., 1688, pp. 27, 12mo), which, *inter alia*, describes several rare mountainous or alpine plants from Wales; Ray's best known work, however, is his *Synopsis Methodica Stirpium Britannicarum* (Lond., 1690, pp. 317, 8vo), which was a remodelled and improved edition of his "Catalogus Plantarum Angliæ" (Cambridge, 1670, pp. 103, 12mo), both of which also bear traces of his Welsh investigations. A second edition of the *Synopsis* was issued in 1696, and among those whose assistance is acknowledged by the author we find Edward Llwyd (1660–1709), the great Welsh archæologist and naturalist. Llwyd travelled much in Wales and elsewhere for the purpose of collecting specimens in natural history for the Ashmolean Museum, being also, in 1693, employed by Dr. Gibson to collect materials in Wales for a new edition of Camden's *Britannia*, which was published in 1695, and for which he contributed a list of Welsh plants.* Lhuyd also contributed materials for a large number of books, brought out by other writers, on questions of natural history (see *Dict. of National Biography*, s. v. Llwyd). The third edition of Ray's *Synopsis* was brought out in 1724 by Dr. Dillenius, who two years later, in 1726, undertook a botanical tour in the company of Samuel Brewer, who at all events went on to North Wales, including Anglesey. Brewer remained in Bangor for more than a twelvemonth, botanizing with the Rev. W. Green and W. Jones, and sending dried plants to Dillenius, particularly mosses, thus clearing up many doubtful points. A species of rock-rose, a native of North Wales, discovered by him, bears the name of *Helianthemum Breweri*. A transcript by Solander of his MS. "Botanical Journey through Wales" is preserved in the Botanical Department of the British Museum.

Among others who also botanized in Wales, or deserve to be classed as Welsh botanists at this early period, we may mention the following:—

William Salesbury, who was born early in the 16th century, and is best known as the translator of the New Testament into Welsh, has been shown, from internal evidence, to be the author of a Welsh work on botany, which, however, exists only in a transcript made by one Evan Thomas (or Thomas Evans) in 1763. This transcript was in 1873 in the possession of the late Rev. John Peter (Ioan Pedr), of Bala (1833–77), who was himself an enthusiastic botanist, and who contributed to the *Traethodydd* for 1873 (vol. xxvii., pp. 156–181) an interesting article entitled "William Salesbury fel Llysieuwr" (*i.e.* W. S. as a botanist), dealing with the MS. in question, and giving several extracts therefrom. I have been unable to ascertain the present whereabouts of this transcript.

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* In Gough's edition of Camden's *Britannia* (1789) there is appended to the history of each county a list of rare plants found within its area, the part dealing with Wales being at pp. 465–598 of vol. ii.

The chief authorities cited by Salesbury are Dr. Turner (1520–1568), the author of *Historia de Naturis Herbarum*, and Leonard Fuchs (1501–1566), a Bavarian writer; but he also quotes the authority of a learned Welsh contemporary of his—Sir Thomas ab William, the lexicographer and physician of Trefriw, who is said to have written "a book of medical directions and receipts" (see William's *Eminent Welshmen*, p. 537), or, according to another, a book on herbs and their medicinal properties (*Llyfr Llysiau, gyda'u rhinweddau Meddygol;* see Rowland's *Cambrian Bibliography*, p. 113). Nothing is known at present of Sir Thomas ab William's work, though it was erroneously identified by one writer (Foulkes, *Enwogion Cymru*, p. 1034) with a MS. work on medicine, formerly in the possession of Mr. John Evans, of Liverpool.*

Hugh Morgan (fl. 1569), apothecary to Queen Elizabeth. He had a botanical garden, of which frequent mention is made in Lobel's *Adversaria* (*e.g.* pp. 294, 343, 493), and subsequently also by Gerard, who styles him "a curious conservator of simples."

George Bowles, of Chislehurst (fl. 1604–50), is said to have "spent some time in Wales, where his discoveries were very ample," and is quoted by Johnson (see Pulteney's *Sketches of Botany*, i. 136).

James Newton (1611 ?–1689 ?) botanized extensively in different parts of Great Britain, including South Wales. Ray, who frequently quotes Newton, journeyed in his track to some extent. His collection of plants is in the Sloane Herbarium, 205–7, 236–9).

Morris Lloyd (fl. 1640), of Treiorwerth, Anglesey, is mentioned in Parkinson's *Theatrum Botanicum* (p. 745) as having discovered *Oxyria* in Wales.

John Lightfoot (1735–1788), who was a native of Newent, Gloucestershire, has also left behind him a MS. Journal of a Botanical Excursion made by him in Wales; a transcript of this is preserved in the Botanical Department of the British Museum.

William Morris (ob. 1764), Comptroller of Customs at Holyhead, and better known as the brother of Lewis Morris, is also described as "a good practical botanist," and was the author of a "Collection of Plants gathered in Anglesey," which was consulted by Hugh Davies, the author of Welsh Botanology, but has not been published. There is, however, in the British Museum a copy of Ray's *Synopsis*, ed. 1724, with MS. notes by Morris (Pressmark, 872, K. 27).

The Rev. John Holcombe (fl. 1710–1775), of Pembroke, has been described as *the* Pembrokeshire botanist of the middle of the last century. He was a friend of Lightfoot, and correspondent of Sir J. Cullum and Sir Joseph Banks, both of whom seem to have had the credit of discoveries made by Holcombe. This was pointed out by Professor Babington in a note on "Pembrokeshire Plants and the Rev. Mr. Holcombe," printed in the *Journal of Botany* for 1886, p. 22.*

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* The account given in the above paragraph is chiefly based on the article in the *Traethodydd* quoted above.

Hugh Davies (1739–1821), the son of a rector of Llandyfrydog, in Anglesey, was educated at Beaumaris Grammar School and Jesus College, Oxford, and after taking orders he was successively usher at the Beaumaris School (? 1762–1778), incumbent of Beaumaris (1778–1787), and of Aber, Carnarvonshire (1787–1816); the last of which livings he resigned, and then retired to live at Beaumaris. He was probably the greatest authority on botany that Wales has ever produced. His opinion was frequently sought by eminent scientists; and he rendered much assistance to Pennant, whose acknowledgment thereof is couched in terms of his praise. His *Welsh Botanology*, published in 1813 (and entered below), has been the foundation of much, if not most, of what has subsequently been written on the subject of Welsh botany.

In the present century we find that the Rev. William Bingley (1774–1823), who was a well-known botanist, appended to his *Tour Round North Wales*, performed during the summer of 1798 (2 vols., London, 1800, 8vo), "A Catalogue of the more uncommon Welsh Plants, with their places of growth" (printed at vol. ii., pp. 371–433). This list, with apparently some additions, is reproduced (under the title of "*Flora Cambrica:* a Systematical Catalogue of the more uncommon Welsh Plants, with their Places of Growth and Times of Flowering") as an appendix to an enlarged edition of the preceding work bearing the name "North Wales . . . . delineated, from two excursions during the summers of 1798 and 1801" (2 vols., London, 1804, 8vo, 2nd ed., 1814). What is described as a third edition of Bingley's work, "with corrections and additions made during excursions in the year 1838, by his son, W. R. Bingley," was brought out in 1839 (1 vol., London, 8vo, 1839, pp. 355), but it is so altered as to contain very little of the original. The Catalogue of Plants is omitted, but lists of Snowdonian plants are given instead on pp. 125 and 129.

The Rev. John Evans, sometime Fellow of Jesus College, Oxford, also published in 1800 a *Tour through North Wales in 1798*, "with botanical researches," a second edition of which was also issued in 1804. The same writer issued in 1804 a companion volume, entitled, "Letters written during a tour through South Wales in 1803," and he also wrote the account of North Wales which formed vol. xvii. of *The Beauties of England and Wales* (London, 1812, 8vo). In all three works considerable attention is paid to the natural history of the country.†

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* See also *Biographical Index of Botanists*, p. 84, and the authorities there cited.

† Bibliographical details of Evans's works are given in the list of topographical books above. A passage dealing with the rarer plants of Wales has also been quoted from Evans's *North Wales* in the Report of the Commission in the chapter on "Biological Conditions." [This is the passage from which we have quoted in our preliminary note.—Ed. Journ. Bot.]

Sir J. E. Smith, the distinguished botanist, visited his friend, Thomas Johnes, at Hafod, in North Cardiganshire, in the summer of 1796 and at several other times. In 1810 he published an account of these visits under the title "A Tour to Hafod, in Cardiganshire, the seat of Thomas Johnes, Esq., M.P., &c., &c. By James Edward Smith, M.D., F.R.S., &c., President of the Linnean Society. London. Printed by T. Bensley, Bolt Court, for White & Co., Horace's Head, Fleet Street. 1810." The book, which is a folio volume, printed on large paper, is remarkable for a number of steel engravings of the scenery around Hafod, but the letterpress also contains numerous observations as to the rarer plants of the district.

Perhaps the most interesting account of a modern botanical excursion in Wales is that published in the *Bulletin de la Société Botanique de France*, tom. x. It is by the late M. J. Gay, an acute French botanist, who, in August, 1862, made a "voyage botanique en Carnarvonshire," with the special object of studying the species of *Isoetes* found in that region. He was accompanied by Prof. Babington and the Rev. W. W. Newbould. "His account of the flora of Snowdon is charmingly written, and contains a great deal of information."

Many other topographical works have been issued from time to time containing some references to the flora of the districts with which they deal. We can give only a few instances. Thus Mr. S. C. Gamwell's Official Guide and Handbook to Swansea and District, published in 1880 (Swansea, 8vo, pp. 194), in connection with the visit of the British Association to that town, contains a chapter on the natural history of the district, including a list (at pp. 165–6) of "some of the rarer flowering plants and ferns of the district." The British Association Handbook for Cardiff and District, edited by Mr. Ivor James (Cardiff, 1891), similarly contains an article (at pp. 200–7) by Mr. T. H. Thomas, R.C.A., on the botany of the district, to which we are indebted for some of the information given here.

The Traveller's edition of *The Gossiping Guide to Wales* (Oswestry: Woodhall, Minshall & Co.), by Askew Roberts and Edward Woodall, has in its introduction an account of "A botanical ramble at Barmouth," by the [late] Bishop of Wakefield, and "Reminiscences of botanical rambles about Snowdon and its neighbourhood" by the Rev. Canon Butler. These are printed, in the edition issued in 1893, at pp. xliii–liii.

The most important contribution of this kind, perhaps, is the article on Botany supplied by Mr. James Britten, of the Botanical Department of the British Museum, to Jenkinson's *Practical Guide to North Wales* (London, 1878, 8vo, 4th ed., 1887), where it is printed at pp. lxxxi–xcix. This gives a brief bibliographical list, arranged by counties, as well as the habitats of a large number of the rarer plants.

There are also several general works on botany which give lists of plants arranged according to counties. Among the earliest of this kind (apart from Gough's Camden, which we have already mentioned) is Thomas Martyn's *Plantæ Cantabrigienses* . . . . "to which are added Lists of the more Rare Plants growing in many parts of England and Wales" (London, 1763, 8vo, pp. 114). The only Welsh counties for which such lists are, however, given are those of Anglesey, Carnarvon, and Merioneth.

Turner and Dillwyn's *Botanist's Guide* (2 vols., Lond., 1805, 8vo, pp. 804) gives very complete lists for all the Welsh counties which are interspersed among those of England according to their alphabetical order. A valuable feature of these lists is that the authority for each entry is stated opposite it. A later work in which the topographical arrangement is also followed is H. C. Watson's *New Botanist's Guide* (2 vols., London, 1837). The lists for the Welsh counties—generally contributed by local naturalists—are grouped together at pp. 215–254 of vol. i., supplements being also added at pp. 629–635 in vol. ii.

Lists of the plants of each of the Welsh counties will also be found in H. C. Watson's *Topographical Botany*, 2nd ed. (1883). Scattered notices of Welsh plants may also be found in the *Journal of Botany* (from 1863 to the present time), and in the Reports of the Botanical Exchange and Botanical Record Club.

This is perhaps the most convenient place to mention a work by Edward Young (of Wauncyrch, Neath) on *The Ferns of Wales*, published at Neath in 1856 (4to, pp. v + 29). The author, in the introduction to his work, which is illustrated by specimens of thirty-four species, says: "It is generally considered that there are forty species of ferns found in the British Isles; of these, thirty-four are met with in Wales."

In addition to the Welsh botanists whom we have already named there still remain to be mentioned a few who belong to the present century, of whom (though they have not all written on the subject) we may give the following tentative list:—

(1.) John Wynne Griffith (fl. 1783–1855), a lichenologist, of Garn, near Denbigh, communicated lists to Bingley's *Tour Round North Wales*, and contributed to the 3rd ed. of Withering's *Systematic Arrangement of British Plants.*

(2.) Thomas Price, better known to Welshmen as *Carnhuanawc* (1787–1848), took great interest in indigenous plants of Britain, many of which he cultivated about his residence at Cwmdu, near Crickhowell (see his *Literary Remains*, ed. by Jane Williams, ii., pp. 280–1).

(3.) James Motley, of Aberafon, Glamorganshire (and subsequently of Borneo, where he was murdered about 1855). He contributed to the *Phytologist*, ii. (1847), and the *Journal of Botany*, 1847; also a list of Carmarthen plants supplied by him appears in H. C. Watson's *Topographical Botany* (p. 551). He also wrote "Tales of the Cymry" (see Cadrawd's *History of Llangynwyd*, 54, 170).

(4.) Dr. J. W. G. Gutch (1809–1862), though born at Bristol, may almost be claimed as a Welsh botanist, owing to his having lived for a length of time at Swansea, and having compiled a list of Swansea Plants (see *Phytologist*, vol. i. (1844), p. 104, &c.).

The herbarium of another botanist, J. E. Bicheno (1785–1851), is now deposited at the Royal Institution, Swansea. He was brought into contact with the district by being engaged for some time in mining speculations in South Wales, and he then resided at Tymaen, near Pyle, Glamorganshire. In connection with Swansea the name of Lewis Weston Dillwyn (joint author of the *Botanist's Guide*) should also be mentioned, and particulars of his works relating to the flora of the district are given below.

The *Biographical Index of British and Irish Botanists*, by Messrs. Britten and Boulger, may also be consulted for short notices of Welsh botanists, exclusive of such as are now living.

Of works in Welsh, the earliest which gives any account of plants is the *Meddygon Myddfai*, being the medical practice of Rhiwallon, of Myddfai, in Carmarthenshire, and his sons, written in the 13th century and later, and published by the Welsh MSS. Society in 1861. Its notices are naturally officinal. Several other medical MSS. in Welsh, containing more or less botanical matter, are believed to be still preserved in different collections, and reference to some of them is made in *Y Traethodydd* for 1873 (pp. 158–161). Early in the 17th century two Welsh lists of plant-names appeared almost simultaneously, namely, that contributed by "Master Robert Davyes, of Guissaney, in Flintshire," to Thomas Johnson, and printed by him at the end of his edition of Gerard's *Herbal* in 1633, under the title "A Catalogue of the British Names of Plants." This contains about 240 names; "the greater part of them are accurate, but there are among them many mistakes." The other list is a Welsh-Latin "Botanologium," added by Dr. John Davies, of Mallwyd, to his Welsh-Latin Dictionary ("Antiquæ Linguæ Britannicæ et Linguæ Latinæ Dictionarium Duplex" (Lond., 4to, 1632), and reproduced verbatim in the *Origines Gallicæ*, of Boxhorn (Amsterdam, 1654, 4to). This list contains about a thousand Welsh names of plants, and has been the foundation of nearly all subsequent lists of the kind, such as have been inserted, according to Dr. Davies's example, in various Welsh dictionaries, *e. g.:*

(1.) Thomas Jones's Welsh-English Dictionary (Lond., 1688; 2nd ed., Shrewsbury, 1760; 3rd ed., Shrewsbury, 1777). This has Dr. Davies's Welsh list of plants with their English instead of their Latin equivalents.

(2.) John Rhydderch's English and Welsh Dictionary (Shrewsbury, 1725, 8vo), to which is appended "A Compendious Herbal: or the names of most of the Physical Herbs, Trees, and Fruits in English and Welsh."

Similar lists were also published in Thomas Richards's Welsh-English Dictionary ("Antiquæ Linguæ Britannicæ Thesaurus," Bristol, 1753, 8vo; 4th ed., Merthyr Tydfil, 1838), and in Caervallwch's [Thomas Edwards] English-Welsh Dictionary (Lond., 1850; 2nd ed., 1864).

The best and most authoritative performance of this kind, however, is the Rev. Hugh Davies's *Welsh Botanology*, published in 1813, but as its references are confined for the most part to

Anglesey, the work may almost be described as a book on the flora of that county. Its scope may, however, be more precisely understood by reference to its full title, which is given in the list below.

The author acknowledges his indebtedness, so far as the Welsh portion of his work is concerned, to Dr. John Davies's list, "great assistance having been (also) obtained from *Meddygon Myddfai* (from whence indeed Dr. Davies took most of his) and the Archæologia Britannica of Edward Lhuyd."

Welsh lists of plant-names have also appeared in works on the flora of Llanrwst and Llanbrynmair, particulars of both of which are given below.

Some notes on the medicinal uses of a plant known as "Dail llosg y tan" (*Scolopendrium vulgare*) may be found in the *Phytologist* for 1844 (vol. i., pp. 521, 582, 589).

Of herbals written in the Welsh language the best-known are the following:—

(1.) "Herbal, neu Lysieu-Lyfr D. T. Jones, Llanllyfni." This work, which is said to be largely based on Culpepper, was brought out in three parts in 1817, and a 2nd edition was issued in 1818 from Carnarvon (12mo). A 3rd edition, considerably enlarged and with over a hundred illustrations, was brought out about 1862, under the title "Llyfr Dail yr hen Dr. David T. Jones, Llanllyfni. Y Llysieu-lyfr Teuluaidd . . . . gan yr enwog Nicholas Culpepper a Dr. Parkins, a'i gyfieithu i'r Gymraeg gan David Thomas Jones, Llanllyfni" (Caernarfon, 16mo, pp. 289). Appended to this edition, but with a separate pagination (pp. 112), there was published another work, "Llysieuaeth Feddygol; yn cynwys Rhinweddau Iachaol oddeutu tri chant o Lysiau . . . . Gan y diweddar Thomas Parry, Glanygors, Tre'rgarth, ger Bangor."

(2.) A translation of the 7th edition of Coffin's "Botanic Guide to Health" was issued in 1849, under the title "Arweinydd Llysieuol i Iechyd," &c. (Manchester, 12mo).

(3.) The best work of this kind, however, is a "Family Herbal," by the Revs. Rees Price, Cwmllynfell [1807–1869], and Evan Griffiths, Swansea [1794–1873], published in 1849 under the title "Y Llysieu-lyfr Teuluaidd, yn Ddwy Ran: y rhan cyntaf yn traethu ar brif lysiau Cymru, y lleoedd maent yn tyfu, eu hamserau, eu dulliau, a'u rhinweddau. Yr ail ran yn traethu ar y prif Glefydau . . . . ynghyd a chyfarwyddiadau i'w iachau" (Swansea, 8vo, pp. 160, with 31 coloured plates). These works, as their titles suggest, are mainly officinal, but they are also valuable as giving various local Welsh names for the plants referred to in them. There are also numerous Welsh books on Veterinary Practice, and herbal prescriptions are a feature of almost all of them.

An excellent illustrated handbook to the scientific study of botany has just been issued in Welsh, under the title "Gwersi mewn Llysieueg gan George Rees. (Gyda Lliaws o Ddarluniau). Pris Haner-Coron. Aberystwith: Argaffwyd yn Swyddfa'r 'Cambrian News,' 1896." (8vo, pp. 148.) An index of the plants referred to, giving their Welsh and English names, is appended to the work.

We append to these notes a tentative list of books, papers, &c. (other than those already mentioned), dealing with the flora of different districts in Wales.

NORTH WALES GENERALLY.

An Account of the Localities of some of the Rarer British Plants, and others, noticed in North Wales, by Mr. Pamplin and Mr. Irvine, in September, 1854. *Phytologist*, N. S., i. (1855-56), pp. 4-12, 29-35, 51-57, 80-4.

W. P. [William Pamplin]. Welsh Botany [a letter on some Snowdonian and other plants]. *Phytologist* for January, 1858 (ii., 312-5); see also vol. iii., 224; iv., 303-5.

ANON. Botanical Sketches from North Wales. By a Correspondent. *Phytologist* for 1860 (vol. iv., 41-55).

ROGERS (W. Moyle). Notes on some North Wales Plants [counties of Denbigh, Merioneth, and Carnarvon]. *Journ. Bot.* 1886, pp. 338-43, 363-8.

ANGLESEY AND CARNARVONSHIRE.

DAVIES (Hugh), F.L.S. *Welsh Botanology;* part the first, a systematic Catalogue of the native plants of the Isle of Anglesey in Latin, English, and Welsh; with the habitats of the rarer species, and a few observations, to which is added an appendix consisting of those genera, in the first three volumes of Flora Britannica, which are not of spontaneous growth in Anglesey, rendered likewise into Welsh. [Part II.] Llysieuaeth Gymreig, yr Ail Ran; sef Enwau Blagur o bob rhyw, y rhai a amlygir trwy eu cyfieithu i'r Lladin a'r Seisoneg. Ynghyd a byr draethiad o wasanaeth a rhinweddau meddygawl, y rhai mwyaf hynod. (The second part . . . . is an alphabetical catalogue of the Welsh names of vegetables rendered into Latin and English, &c.) London, 1813, 8vo [pp. xvi + xxvi + 255].

GRIFFITH (John E.), F.L.S. *Flora of Anglesey and Carnarvonshire*, with an account of the Flowering Plants, Ferns and their allies, Mosses, Marine Algæ, Lichens, and Hepaticæ, with a map of the two counties (pp. xx-288; Bangor: Nixon and Jarvis, 1895). This includes all the information previously published by the author in *Journ. Bot.*, the *Naturalist*, &c.

WILLIAMS (John), of Llanrwst. *Faunula Grustensis*: being an outline of the natural contents of the parish of Llanrwst. . . . . Also a . . . . catalogue, in Latin, English, and Welsh, of the animals and plants found in it . . . . and . . . . of the diseases that have occurred therein. Llanrwst, 1830, 12mo. [This applies more to Denbighshire than Carnarvonshire.]

LEES (Edwin), F.L.S. On the Botanical Features of the Great Orme's Head; with notices of some plants observed in other parts of North Wales during the summer of 1849. Printed in the *Phytologist* for 1848 (iii., pp. 869-81).

CATHERALL's Hand Book. *The Stranger's Best Guide to Llandudno*, &c. Bangor, 1855 (?); 2nd ed., 1860 (?); 8vo, pp. 64. This contains (at pp. 22-24) "a triglot catalogue"—Latin, English, and

Welsh—of over fifty of the rarer plants of the district, with their habitats.

WOODS (Joseph), F.L.S. On the Botany of the Great Orme's Head, Carnarvonshire. *Phytologist*, N.S. (1855), i., 73–5.

STOWELL (Hugh A.). Flora of the Orme's Head. *Phytologist*, N.S. (1855-6), i., 332–4.

BARTON (J.). Plants of Snowdon. A few Observations on the Character of the Snowdonian Flora. *Phytologist*, N.S., 1857, ii., 145–9; see also pp. 378 *et seq.*).

Plants of Aberconwy and District. *Hist. of Aberconwy.* (Denbigh: Thos. Gee, 1835.)

INCHBALD (Peter). Flora of Llandudno and Neighbourhood. Williams's *Complete Guide to Llandudno*, 1864.

LEY (A.). Species observed in 1886. *Bot. Record Club Rep.*, 1884–6, pp. 152–3.

BAKER (J. G.). On the Rubi of Capel Curig. *Journ. Bot.*, 1891, pp. 47–8.

Flora of Puffin Island. List compiled by W. A. Herdman, D.Sc., F.L.S. *Third Annual Report of Liverpool Marine Biol. Station*, 1890. (Liverpool: T. Dobbs & Co., 1890.) This list includes seventy-six species.

The Flora of Puffin Island, by Professor R. W. Phillips, M.A., B.Sc. Puffin Island Biological Station—Report, 1892-3 (pp. 17–21). Eight species not included in the previous list are included in this.

Note.—Professor Reginald W. Phillips has also written several articles on the Flora of Puffin Island in *Trans. of Liverpool Biol. Soc.*, vols. i–iv., and he has also published lists of plants collected by his class in the fields of Carnarvonshire and Anglesea.

DENBIGHSHIRE.

ROWLAND (John). A Catalogue of Plants growing in the Neighbourhood of Wrexham, in Denbighshire. *Phytologist* for 1844 (vol. i., pp. 421–5).

WILLIAMS (John). [See above.]

FLINTSHIRE.

BROWN (R.). Flintshire Plants not recorded in ed. 2 of "Topographical Botany." *Journ. Bot.*, 1885, pp. 357–360.

MERIONETHSHIRE.

HOW (The Rev. W. Walsham). The Ferns of Barmouth. *Phytologist*, N.S. (1863), vi., 436–8.

JONES (D.), *Chemist and Bookseller, Barmouth.* The Tourist's and Visitor's Handbook and Guide to Harlech, Barmouth, Dolgelly, Towyn . . . . Compiled by the publisher (D. Jones), pp. 158, ii. Barmouth: D. Jones, 1863, 16mo. The "List of Plants of Barmouth and its Neighbourhood" included in this work was contributed by the late Rev. T. Salwey, B.D., F.L.S., Vicar of Oswestry.

KYNOCH (James), of Talyden, Barmouth. Wild Flowers of Barmouth and Neighbourhood. 1884 (?).

——*Second Edition.—Enlarged.* Woodall, Minshall & Co., Oswestry and Wrexham. 1887, 8vo, pp. 10. "The List of 259 Wild

Flowers, collected by Messrs. Himing and Brewer in July and August, 1884, was inserted in the *Cambrian News* of that year, and afterwards reprinted in a separate form. The first edition of one thousand having been exhausted, the publisher has enlarged the second by additional names of flowers, kindly supplied by several botanical friends" (Extract from Preface to the second edition, which contains a list of 500 plants). The list should, we are informed, be used with much caution, owing to its inaccuracies.

MATHEWS (W.). Plants found in North Wales (chiefly in Merionethshire). *Phytologist* for 1853 (vol. iv., 874).

WHITEHEAD (John). Mosses of Merionethshire. *Botanical Record Club Report* for 1879, 107.

LINTON (W. R.). Merionethshire Plants. *Journ. Bot.*, 1895, 359–63.

ROBERTS (May). The Mosses of the Upper Dovey. *Journ. Bot.*, 1896, 330–4 [and 1897, 492].

LEY (A.). *See* under MONTGOMERY.

MONTGOMERYSHIRE.

LEY (A.). List of Plants observed in Montgomery and Merioneth. *Botanical Record Club Report* for 1875, 143–7. *Report* for 1884–6, 149–50.

MORGAN (John), *of Caetwpa*. The Flora of Llanbrynmair. *Bye Gones* for 1892 (2nd ser., vol. ii., pp. 443–52). This list contains the names of over 500 specimens found in the parish. Some brief notes and a short list of about twenty names had been previously published in the *History of Llanbrynmair*, by Mr. Richard Williams, F.R. Hist.S.

Notes on local floras are also found in several parish histories contributed from time to time to the *Montgomeryshire Collections*, which are the Transactions of the Powysland Club.

CARDIGANSHIRE.

LEES (Edwin), F.L.S. Notice of Plants gathered in the vicinity of Aberystwith, Cardiganshire. *Phytologist* for 1844 (vol. i., pp. 38–40).

MORGAN (Thomas Owen). *Flora Cereticæ superioris.* A catalogue of plants indigenous in the neighbourhood of Aberystwith, &c., pp. 18. Aberystwith, 1849. 8vo.

JONES (H. L.). Phanerogams and Ferns observed in Cardiganshire. *Botanical Record Club Report* for 1879, 80–3.

LEY (A.). Plants observed in 1886–7. *Botanical Record Club Report* for 1884–6, 147–9.

Note.—A few details of local flora are also given in the Reports of the Aberystwith College Scientific Society, and a paper on Cardiganshire Flora has appeared in a recent volume of the *Cambridge Philosophical Transactions.*

BRECON AND RADNOR.

WESTCOMBE (T.). List of Plants observed in Brecknockshire and Radnorshire. *Phytologist* for 1844 (vol. i., p. 781).

Barrett (W. Bowles). A Contribution towards a Flora of Breconshire. *Journ. Bot.*, 1885, 39–44, 83–9, 107–12, 145–9. *Botanical Record Club Report*, 1884–6, 141–4.

Phillips (R. W.). Notes on the Flora of Breconshire. *Journ. Bot.*, 1892, 354–5.

Ley (A.). Recent Additions to the Flora of Breconshire. *Journ. Bot.*, 1895, 135–7.

——. Plants of Breconshire. *Bot. Record Club Report* for 1874, 80–6; *Report* for 1881–2, 243–6; for 1883, 53–63; for 1884–6, 144.

Ridley (H. N.). Notes on Radnorshire Plants. *Journ. Bot.*, 1881, 170–4.

Ley (A.). Plants of Radnorshire. *Bot. Record Club Report* for 1874, 80–6; *Report* for 1881–2, 246–7; *Report* for 1884–6, 144–6.

Pembrokeshire.

Falconer (Dr. R. W.). *Contributions towards a Catalogue of Plants indigenous to the Neighbourhood of Tenby*, 1848. The author records the observation of 388 species in the neighbourhood of Tenby.

Lees (Edwin), F.L.S. Notes on the Localities of some Pembrokeshire Plants observed in May and June, 1853. *Phytologist* for 1853 (vol. vi., pp. 1013–8.

Babington (Charles C.)., M.A., F.R.S. On the Botany of South Pembrokeshire. *Journ. Bot.*, 1863, 258–70. This contains a record of 550 plants.

Trimen (Henry), M.B., F.L.S. Plants of South Pembrokeshire (a list of about forty plants not included in Prof. Babington's list). *Journ. Bot.*, 1867, 301–2.

More (A. G.). Plants gathered in the counties of Pembroke and Glamorgan. *Journ. Bot.*, 1884, 43–6.

Carmarthenshire.

Llandeilo-Vawr and its Neighbourhood; Past and Present, together with Zoological, Botanical, and Geological Sketches, as well as a Review of the Commerce and Commercial Capabilities. By William Davies (Gwylim Teilo). Llandeilo: Printed by D. W. & G. Jones, Rhosmaen Street. 1858, 8vo, pp. 175. This work contains (at pp. 153–164) "A Catalogue of Plants growing in the Neighbourhood of Llandeilo. Arranged after the classification of De Candolle.

Glamorganshire.

Dillwyn (Lewis Weston). *Materials for a Fauna and Flora of Swansea and the Neighbourhood*, &c. Swansea, 1848, 8vo. Privately printed, pp. 18. This book (which was an expansion of "The Rarer Plants of Swansea" (1828), by the same author) was dedicated to (Lord Northampton) the President of the British Association, which held its annual meetings at Swansea in 1848. It was issued from the local press on the first day of the meetings. Mr. Dillwyn himself, then in his seventieth year, filled the chair as President of the section on Zoology and Natural History.

Papers communicated to the Royal Institution of South Wales, by L. W. Dillwyn, Esq., F.R.S., F.L.S., F.G.S., President, and J. Dillwyn Llewelyn, Esq., F.R.S., F.G.S., Vice-President. Swansea: Printed by E. Griffiths, High Street, 1841. [pp. 8, 8vo.] Mr. Dillwyn's paper is "On the effects of the last winter on the Shrubberies at Sketty Hall, with some occasional remarks on other Shrubberies in the Neighbourhood."

Gutch (J. W. G.). A List of Plants met with in the Neighbourhood of Swansea, Glamorganshire. *Phytologist* for 1844 (vol. i., 104, 118, 141, 180).

——. Additions to the List of Plants met with in the Neighbourhood of Swansea. By T. B. Flower and Edwin Lees, Esqrs. *Phytologist* for 1844 (vol. i., 377–380).

Westcombe (T.). Localities of a few Plants lately observed (in Glamorganshire, in addition to Gutch's list). *Phytologist* for 1844 (vol. i., 780).

More (A. G.). *See* under Pembroke.

Storrie (John). *The Flora of Cardiff*; a descriptive list of the indigenous plants found in the district of the Cardiff Naturalists' Society, with a list of the other British and exotic species found on Cardiff Ballast Hills. pp. 129. Cardiff Naturalists' Society: (Cardiff;) London (printed), 1886, 8vo.

Monmouthshire.

Clark (J. H.). *The Flora of Monmouthshire.* Usk: Printed at "The County Observer" Office. 12mo, pp. i–xliv. No date, but circa 1868, or possibly a little earlier. This was subsequently reprinted in "Sketches of Monmouthshire," by the same author (Usk, 1868). *See* list of Topographical Works, &c., *supra.*

Reader (H. P.). Monmouthshire cryptograms [*sic*]. *Journ. Bot.*, 1882, 120.

——. New Records for Monmouth. *Journ. Bot.*, 1886, 368–70.

DECADES PLANTARUM NOVARUM AUSTRO-AFRICANARUM.

Auctore R. Schlechter.

DECAS VII.

(Continued from vol. xxxv. p. 433.)

61. **Oxalis gracilipes**, sp. n. Herba perennis, tenella, 8–13 cm. alta; caule (vel potius stipite) gracili teretiusculo aphyllo, basi squamato, nudo, puberulo; foliis ad apicem caule fasciculatis graciliter petiolatis, trifoliolatis, petiolo filiformi, teretiusculo, puberulo, foliolis 2–3-plo longiore, foliolis linearibus, apice breviter excisis, subtus puberulis, superne glabris, 0·7–1 cm. longis; pedicellis subfiliformibus, teretibus puberulis, dimidio superiore minute bibracteolatis, sub anthesi foliis fere æquilongis vel paulo brevioribus; calycis segmentis lineari-lanceolatis subacutis, densius cano-

puberulis, 0·4 cm. longis; corolla 1·2–1·5 cm. longa, infundibularis, tubo e basi ampliato, lobis rotundatis obovatis, glaberrima; ovario villoso, loculis 2-ovulatis; stylis dimidio inferiore villosis, dimidio superiore glabris.

In regione austro-occidentali: In arenosis sub fructibus in monte Pakhuisberg, Jul. 1896; *L. C. Leipoldt*, No. 294.

Approaching *O. stenocarpa* Schltr. and *O. brachycarpa* Schltr., differing from the former by the much shorter fruit; from the latter by much denser indument, shorter tube to the corolla, and the styles. I have not seen tubers. The flowers are white, with a sulphur-yellow tube.

62. **Oxalis Leipoldtii,** sp.n. Herba perennis, gracilis, fere spithamæa; caule stricto vel subflexuoso, simplici, teretiusculo, glanduloso-puberulo, foliato; foliis omnibus sessilibus, trifoliolatis, foliolis subæquilongis linearibus vel cuneato-oblongis, glanduloso-puberulis, intus glabris, 0·3–0·5 cm. longis; pedicellis axillaribus, erecto-patentibus filiformibus, glanduloso-puberulis sub anthesi 1·5–2 cm. longis, post anthesin elongatis, usque ad 4·5 cm. longis; bracteolis nullis; calyce dense glanduloso-puberulo, 0·2–0·3 cm. longo, segmentis lineari-lanceolatis acutis; corolla alte infundibulari, 1·5–1·6 cm. longo, tubo apicem versus paulo dilatato, illo *O. purpuratæ* Thbg. simili, glaberrimo, segmentis rotundatis basin versus angustatis, glabris; stylis basi hispidulis, dimidio superiore glaberrimis, ovario strigoso; capsula rotundata, strigosa, calycem haud excedente; seminibus oblongis.

In regione austro-occidentali: In collibus pone villam Clanwilliam, alt. c. 400 ped., Junio 1897; *L. C. Leipoldt.*

This species should be placed next to *O. viscosa* E. Mey., from which it is separated by the slenderer pedicels, the want of the bracteolæ, the longer and more cylindrical corolla-tube with a purplish limb.

I have not seen tubers, but, judging from a few scales adhering to the roots, they most resemble those of *O. glabra* Jacq. The stems appear to grow in tufts, like those of *O. multicaulis* E. Mey.

63. **Polygala Dodii,** sp. n. Gracilis, adscendens, c. 20 cm. alta, e basi ramosa; ramis filiformibus tomentosulis foliatis; foliis erecto-patentibus patulisve, linearibus acutis, basi apiceque paulo angustatis, utrinque molliter puberulis, 0·9–1·4 cm. longis, 0·1–0·2 cm. latis; racemis terminalibus laxe plurifloris; floribus pallide roseis, alis albidis, illis *P. Garcini* DC. paulo brevioribus, basi bibracteolatis; bracteolis mox deciduis minutissimis; pedicellis glabris, brevibus; calycis foliolis suborbicularibus obtusis, concavis, margine ciliatis, dorso glabris, 0·2 cm. longis, alis obliquis, subunguiculatis, late oblongis obtusis glabris, 0·6 cm. longis, medio fere 0·4 cm. latis; petalis oblique oblongis dimidio superiore paulo dilatatis, apice inæqualiter obtuse bilobulatis, dimidio inferiore utrinque pilis reflexis puberulis, 0·6 cm. longis, infra apicem 0·2 cm. latis; carina late unguiculata, lamina parva cucullata obtusa, appendice flabellato pectinato, 0·3 cm. longo, unguiculo pilis reflexis puberulo, 0·3 cm. longo, lamina intus glabra vix 0·2 cm. excedente; ovario glabro, stylo cylindrico stigmate 2-labiato

excavato; capsula obcordato-oblonga, alis paulo breviore, vix latiore; seminibus dense sericeis.

In regione austro-occidentali: In lapidosis pone "Castle Rock," prope Capetown, 31 Jan. 1896; *Capt. Wolley Dod*, No. 813.

Quite different from any described South African species; perhaps nearest to *P. pubiflora* Burch., from Riversdale, and *P. hispida* Burch., from George and the south-eastern region, yet very distinct in its floral characters. The flowers resemble somewhat those of *P. Garcini* DC. The alæ are whitish, the petals purplish, the appendage of the carina white.

64. **Agathosma alpina,** sp. n. Fruticulus erectus, ramosus, 30–40 cm. altus; ramulis erectis vel suberectis, subteretibus, glabris, pallidis, foliatis; foliis subsessilibus, coriaceis, oblongis obtusis apice pilis nonnullis, flexuosis ciliatis, ceterum glabris, glandulis impressis, pellucidis punctatis, superne lucidis, 0·5–0·7 cm. longis, medio fere 2–2·5 mm. latis, 1-nerviis; floribus ad apices ramulorum in caput semiglobosum agglomeratis, breviter pedicellatis, vel subsessilibus; bracteis late ovatis acuminatis erubescentibus, ciliatis; calyce c. 0·2 cm. longo, campanulato, segmentis oblongis obtusis margine ciliatis, tubo longioribus; petalis erecto-patentibus, calycem duplo vel plus duplo superantibus, ungue gracillimo glabro, lamina obovato-oblonga obtusa utrinque glabra. ungui breviore; staminibus sterilibus erectis, linearibus obtusis, basin versus angustatis, dimidio inferiore pilosis, apice glandula coronatis, calycem paulo excedentibus; staminibus fertilibus erectis, filamentis filiformibus, glabris, antheris parvulis rotundato-oblongis; stylo filiformi villoso, apice glabrato; ovarii cornubus pilosis.

In regione austro-occidentali: In saxosis montis "Matroosberg," in ditione Worcester, alt. c. 7000 ped., Dec. 1895; *Dr. R. Marloth*, No. 2259.

The capitate inflorescence brings our plant near to *A. lancifolia* E. & Z. The leaves and floral characters at once distinguish it from that species. In the dried specimens the colour of the flowers is pink.

65. **Berardia velutina,** sp. n. Fruticulus gracilis, erectus, ramosus, 30–40 cm. altus; ramis velutinis teretibus, dense foliatis; foliis lanceolatis acutis, sessilibus erectis, dorso margineque molliter villosis, intus glabris, 0·4–0·6 cm. longis, infra medium 1·5–2 mm. latis; floribus in capitulis globosis, plurifloribus, terminalibus, 0·5 cm. diametientibus; bracteis lineari-lanceolatis calloso-apiculatis, villosis, flori vulgo æquilongis; bracteolis bracteis valde similibus; calyce dense villoso, c. 1·5 cm. longo, segmentis linearibus calloso-apiculatis, plumoso-villosis, acutis, intus glabris, tubo æquilongis; petalis oblongis obtusis, segmentis calycis æquilongis, dorso medio villosis, intus glabris; filamentis subulatis brevibus ad basin segmentorum insertis, antheris oblongis obtusis, haud exsertis, petalorum dimidium paulo excedentibus; stylis glabris, erecto-patentibus filiformibus, 0·1 cm. longis; ovario villoso, loculis 2-ovulatis.

In regione austro-occidentali: In paludibus montis "Matroosberg," in ditione Worcester, alt. c. 5000 ped., Dec. 1895; *Dr. R. Marloth*, No. 2255.

In general appearance resembling *B. Dregeana* Sond., but well distinguished from that species by its included stamens. If Sonder is right in saying that the cells of the ovary are always 1-ovuled, my plant forms the type of a new subgenus, differing from all the other species in the 2-ovuled ovary-cells.

66. **Othonna patula,** sp. n. Suffrutex, humilis decumbens vel adscendens, 10–20 cm. altus; ramis radicantibus, foliatis; foliis carnosis semiteretibus mucronulatis, basin versus angustatis, glabris, 1·5–2 cm. longis, medio fere c. 0·3 cm. latis, internodia multo excedentibus, ad basin ramulorum; pedunculis terminalibus simplicibus vel 1-ramosis, monocephalis, teretibus glabra; capitulis florum patulis; involucro c. 1 cm. diametiente, 0·8 cm. longo, foliolis 7–8 lanceolatis vel oblongis, acutis vel obtusis, plerumque membranaceo-marginatis glabris, usque ad basin liberis; floribus radii c. 12, e basi tubulosa ligulatis, apice breviter 3-lobulata vel obtusa, 0·9 cm. longis, ligula medio fere 2·5–3 mm. lata; floribus disci tubulosis glabris, tertia parte basilari angustatis, apicem versus paulo ampliatis, 0·4 cm. longis, fauce 0·1 cm. diametro, lobis erectis brevibus ovato-triangulis subacutis; antheris anguste linearibus obtusiusculis, 0·2 cm. longis, loborum apices subattingentibus, filamentis filiformibus glabris, antheris brevioribus; stylo filiformi glabro, brachiis 0·1 cm. longis, antherarum apices attingentibus; acheniis oblongis glabris, apice annulo circumdatis; pappi setis numerosis asperis.

In regione austro-orientali: In saxosis montium prope Queenstown, alt. c. 4000 ped., Febr. 1894; *E. E. Galpin*, No. 1811.

Belonging to the group "*Carnosæ*," nearest to *O. crassifolia* Harv. and *O. sedifolia* DC., differing from both by the rooting branches and the achenes.

67. **Felicia amelloides,** sp. n. Fruticulus erectus, ramosus, 1½–2-pedalis; ramulis erectis, dense foliatis, strigoso-puberulis; foliis oppositis, parvulis, lineari-subulatis obtusis, textura crassiusculis, sparsim pilosis, 0·4–0·6 cm. longis, internodia excedentibus; florum capitulis terminalibus, solitariis, c. 2·5 cm. diametientibus, pedunculo puberulo 1·5–2 cm. longo; involucri foliolis subunifoliatis linearibus acutis, pilosis, margine nunc anguste subhyalino-marginatis, brevissime ciliatis, 0·6 cm. longis; floribus radii c. 12, e basi filiformi-tubulosa ligulatis, 4-nerviis, apice minute 3-dentatis, c. 1 cm. longis, 0·3–0·4 cm. latis, fertilibus; floribus disci tubulosis, 0·4 cm. longis, tubo apicem versus sensim ampliato, dimidio inferiore hispidulo, dimidio superiore glabro, lobis erectis minutis; antheris anguste linearibus, filamentis filiformibus glabris, antheris longioribus; stylo filiformi glabro, brachiis in floribus disci antherarum apices attingentibus, anguste lineari-filiformibus apice paulo dilatatis, in floribus radii exsertis subfiliformibus; achæniis compressis oblongis, puberulis; pappi setis asperis numerosis, c. 0·4 cm. longis.

In regione austro-orientali: In saxosis in cacumine montis "Mont aux Sources" in terra "Orange Free State," alt. c. 9500 ped., Jan. 1896; *J. Thode*.

Near *F. barbata* Schltr. (*Aster barbatus* Harv.), with larger heads, longer and wider blue rays, more thickly-set leaves, and more shrubby habit. Only known to me from Mr. Thode's collection.

68. **Thesium polyanthum**, sp. n. Suffrutex adscendens, ramosissimus, semipedalis; ramulis subflexuosis, divaricatis, plus minus flexuosis, angulatis, remote foliatis; foliis minutis lineari-lanceolatis acutis vel mucronulatis, glabris, fere 0·2 cm. longis; floribus ad apices ramulorum paucis, corymbulosis; bracteis ovato-lanceolatis acutis, margine vulgo minutissime ciliato-serrulatis, glabris, flori æquilongis vel parum brevioribus, bracteolis linearibus carinatis, tubum vix excedentibus; perigonio c. 0·2 cm, longo, extus glabro, segmentis erecto-patentibus ovatis acutis apice incrassatis, intus pallidis margine minute ciliolatis, 0·1 cm. longis, basi medio fasciculo pilorum ad antheras tendentium ornatis; staminibus erectis infra basin segmentorum insertis, filamentis subfiliformibus, 0·5 mm. longis, antheris rotundatis 0·5 cm. longis; stylo e basi conico subcylindrico, glabro, dimidium antherarum attingente; fructu subpyriformi, 0·4 cm. longo, medio fere 0·2 cm. diametiente, nervis primariis basi tantum visis, ceterum lævi.

In regione austro-occidentali: Juxta vias prope Kommetjes, in peninsula Capensi, Sept. 1896; *Capt. Wolley Dod*, No. 1551.

Allied to *T. corymbuligerum* Sond., but much stronger-growing and decumbent (not erect), with larger flowers, and a very different fruit; also much more divaricately branched. The tips of the green perianth-segments are brownish outside, the whole flower whitish within.

69. **Eriospermum patentiflorum**, sp. n. Gracillimum, erectum, flexuosum, 30–40 cm. altum; foliis sub anthesi jam emarcidis ignotis; scapo basi vagina obtusa circumdato, glaberrimo stricto vel subflexuoso, tereti, glaberrimo; racemo elongato laxe multifloro; bracteis minutis patentibus, c. 0·1 cm. longis; pedicellis patentibus, filiformibus, gracillimis, inferioribus c. 2·5 cm., superioribus c. 1 cm. longis; perianthii segmentis lineari-oblongis obtusis, basin versus paulo angustatis, utrinque glabris, niveis dorso vittæ purpurascente pictis, 0·6 cm. longis; dimidio superiore c. 0·2 cm. latis; staminibus basi segmentorum affixis, anguste linearibus apice attenuatis, vix 0·4 cm. excedentibus, glabris, antheris oblongis obtusis, 0·5 mm. longis; ovario subgloboso, glabro, stylo filiformi, glabro, apices segmentorum attingente.

In regione austro-occidentali: In collibus prope villam Clanwilliam, alt. c. 300 ped., April 1897, *L. C. Leipoldt*.

If this species had not been so distinct, I would not have dared to describe it without having the leaves; however, seeing that it could always easily be recognized by the inflorescence, I thought it best to publish it, so as to direct upon it the attention of any collector who might happen to come to Clanwilliam. Of course, as long as the leaf is unknown, the position of the plant must remain doubtful.

70. **Bulbine flexuosa**, sp. n. Gracilis, erecta, 10–15 cm. alta; tubere late ovoideo basi præmorso, in radice napiforme divaricatas producto, c. 1·5 cm. alto; foliis sub anthesi nondum bene evolutis,

filiformibus acutis glabris; scapo basi vaginis membranaceis brevibus basibus foliorum emarcidorum circumdato, valde flexuoso; racemo laxiusculo elongato plurifloro, cylindrico, bracteis minutis membranaceis obtusis, 0·1–0·2 cm. longis; pedicellis erecto-patentibus filiformibus glabris, inferioribus usque ad 1·5 cm. longis, superioribus sensim minoribus; perianthii segmentis ovato-oblongis, obtusis, 1-nerviis, 0·4 cm. longis, medio fere c. 2·2 cm. latis; staminibus erecto-patentibus anguste linearibus dimidio superiore subfiliformibus, supra medium pilis patentibus barbatis, apice glabris, c. 2 cm. longis, antheris lineari-oblongis obtusis, 0·1 cm. longis; ovario subgloboso, glabro; stylo filiformi, glabro, c. 2·5 mm. longo, antheras superante.

In regione austro-occidentali: In collibus aridis prope villam Clanwilliam, alt. c. 300 ped., Maio 1897; *L. C. Leipoldt.*

A very distinct species, somewhat allied to *B. minima* Baker, but well distinguished by the wiry twisted stem, which resembles that of *Carpolyza* and of *Schizodium.* Amongst my specimens there is only one bearing a small filiform glabrous leaf, although they have been well advanced; this seems to prove that leaves appear when the plant is deflorate, as, for instance, is the case in *B. favosa* Roem. & Schult.

NEW PLANTS FROM SOMALI-LAND.

By A. B. Rendle, M.A., F.L.S.

The following novelties are from the collection made last winter by Mrs. Lort Phillips and her friends in Somali-land, and presented to the British Museum:—

Pentanopsis, gen. nov. Sepala 4 herbacea, subæqualia, persistentia, sed fructu haud accrescentia. Corolla infundibuliformis, tubo tenui elongato, limbi lobis 4 valvatis, ellipticis, subpatentibus, margine et facie superiore puberulis. Antheræ 4, infra faucem corollæ sessiles, dorso affixæ, anguste lanceolatæ, basi integræ, longitudinaliter dehiscentes. Discus tumidus. Ovarium subcampanulatum 2-loculare; stylus filiformis cum apice bifida exserta, segmentis linearibus; ovula in loculis numerosa, in placentis crassis septo affixis peltatim inserta. Capsula 2-locularis, endocarpis corneo loculicide in valvis 2 oblongis dehiscente. Semina . . . . Frutex diffusus ramis teretibus, juvenilibus hispidulis. Folia parva opposita, sessilia, lineari-oblanceolata, basi angustata, uninervia. Stipulæ interfoliaceæ, membranaceæ, integræ, connatæ, cum folii basi subindurato persistentes. Flores in dichasia 3-flora, interdum ad florem centralem reducta, subsessilia, axillaria dispositi, albi; bracteæ foliaceæ. Terra somalensis. Species 1.

Genus novum *Rubiacearum* e tribu *Hedyotidearum* ad genus *Neurocarpæam* R. Br. (*Pentadem* Benth.) accedente.

After much consideration, I have decided to separate this plant from Bentham's *Pentas*, as, though resembling it in the general structure of the flower, it lacks all the striking characters of the older genus, namely, the marked inequality of one or more of the sepals, the terminal corymbose inflorescence, and the fimbriated stipules. The brown scale formed by the persistent leaf-base and the remains of the membranous stipule (which very soon becomes split down the middle) gives a characteristic appearance to the branches. As Mr. Hiern has pointed out to me, I have somewhat enlarged the scope of the genus by the inclusion of *Neurocarpæa* (*Pentas*) *quadrangularis* (Journ. Bot. 1896, 127), but I do not care to stretch it to include the plant now in question.

Pentanopsis fragrans, species unica; ramis subtenuibus, duris, cinerascentibus; foliis anguste lineari-oblanceolata interdum lanceolata, basi valde angustatis, cum apice breviter mucronata, et faciebus marginibusque scabridulis; florum pedicellis, ovario brevioribus, hoc sparse albiter scaberulo et cum vittis latis 4 e sepalorum basibus ortis inconspicue notato, sepalis viridibus late lanceolatis ad lineari-oblongas cum apice angustata, obtusis vel acutiusculis, margine scabridulis; corolla fragrante, sepala quintuplo excedente.

Hab. Wagga Mountain, Mrs. E. Lort Phillips.

Leaves 15–18 mm. long including stipules (4 mm.) by 2·5–3 mm. greatest breadth, margins narrowly revolute. Bracteoles foliaceous, 11 mm. long, including the stipular sheath (2 mm.), which surrounds the short flower-stalk (2 mm.). Flowers sweet-smelling, sepals 5–6 mm. long by 1·25–1·5 mm. wide, remaining in a withered condition in the fruit, but not enlarging. Corolla-tube about 2·5 cm. long, a little over 1 mm. in diameter below, widening to 2 mm. at the insertion of the stamens, lobes about 1 cm. long by half as broad, bearing very short rather thick hairs extending just into the mouth of the tube. Anthers 2 mm. long; style-limbs 4 mm., exserted at mouth of tube. Ovary 2·5–3 mm. long. Capsule sparsely scabridulous, about 5 cm. long.

Lortia, gen. nov. Cyathium crateriforme, lobis 5 subbrevibus, squamiformibus, fimbriatis; glandula unica, crassiuscula, truncata, cyathium amplectens, in parte anteriore interrupta. Flores ♂ numerosi, pedicellati, in fasciculos 5-lobis cyathii oppositos conferti. Perianthium 0. Stamen filamento brevi cum pedicello articulato; antherarum loculi globosi distincti. Pollen breviter oblongum, longitudinaliter vittatum. Flos ♀, et centralis solitarius, perianthio brevissimo lobato. Ovarium sessile, 3-loculare; styli basi connati, apice bifidi. Ovula in loculis solitaria. Herba, ut apparet, parva, crassiuscula; folia sessilia, orbicularia, mucronata, margine crispula. Cymæ in foliorum superiorum axillis solitariæ, pedicillatæ; bracteæ oppositæ cyathium singulum campanuliformiter includentes. Terra somalensis. Species 1.

Genus novum *Euphorbiacearum*, e tribu *Euphorbiacearum* ad genus *Monadenium* Pax accedente.

Described from a small specimen collected by Mrs. E. Lort Phillips (in honour of whom the genus is named) on Wagga Mountain. The inflorescences are very characteristic. In the bud state they are nodding, when mature the upper part of the not very long stalk is bent horizontally. The bracts, which are connate above the middle behind, and split nearly to the base with overlapping edges in front, form a bell-shaped involucre with an entire edge, except for the short apiculus into which the midrib of each runs. They enclose the deep, bowl-shaped cyathium, the central member of a dichasium of which the two lateral branches are represented by insignificant rudiments. The cyathium closely resembles that of a *Monadenium*, but is more globular in form. The truncate gland has a swollen margin, and is interrupted in front, exposing the two anterior lobes of the involucre, which it slightly overtops. The bracteoles included in the involucre are narrower and shorter than its lobes, and much fimbriated. The genus is nearest to the East African *Monadenium* Pax (described and figured in Engler's *Jahrbuch*, xix. 126), which I have not seen. It differs in its simple axillary inflorescences, *Monadenium* having a much-branched dichasial arrangement; while the bell-shaped involucre surrounding the cyathium contrasts strongly with the erect, stiff-looking, bicarinate structure of *Monadenium*, which is also described as having no perianth in the female flower.

Lortia erubescens, species unica; foliis juvenilibus (?) crassiusculis sessilibus orbicularibus mucronatis, cum margine crispulo, minute pubescentibus, rubris cum venulis pallidis lineatis; inflorescentiæ pedicello subvalido quam bracteæ campanuliforme, paullo longiore; cyathii lobis 5 subæqualibus, glabris, rhomboideis, fimbriatis, quam glandula vix brevioribus; perianthio floris ♀ inconspicue lobato.

Hab. Wagga Mountain, Mrs. E. Lort Phillips.

Leaves 17 to 18 mm. long, and nearly as broad. Pedicel of inflorescence stout, a little over 1 cm. long; bracts 9 mm. long and broad. Cyathium 5 mm. high; lobes scarcely 2 mm.; gland 2–2·5 mm. high. Stamens 2 mm. long, including the anthers (·5 mm.); pollen shortly oblong, with longitudinal bands. Female flower scarcely 5 mm. long, including the pedicel (1·5 mm. long); perianth represented by a short shallow lobed cup round the base of the ovary; a few very short scattered hairs on the base of the style and style-arms.

Jatropha Phillipseæ, sp. nov. Frutex velutino-pubescens, foliis petiolatis, e basi triangulari trilobis, vel interdum quinquelobis cum lobis externis minoribus, lobis subpatentibus, obtusis vel rotundis, margine glanduloso-dentatis; stipulis purpureis setaceo-dissectis, setulis apice glanduligeris; dichasiis pubescentibus; bracteis ovatis quam folia multoties minoribus, margine glanduloso-setuliferis; floribus breviter pedicellatis, sepalis ♂ late oblanceolatis, basi connatis, pubescentibus, externis glanduloso-dentatis; corolla campanulata, viride superne rubescente, lobis late spathulatis; glandulis disci subglobosis; sepalis ♀ in fructu persistentibus quam in mare majoribus; capsula oblonga, glabra, rugulosa; seminibus glabris, carunculo bilobo, lobis planis crenulatis.

Hab. Wagga Mountain, Mrs. E. Lort Phillips.

Shoots thick, terete, striated, covered like the rest of the plant with a dense short white pubescence. Petioles on the lower leaves

1·5 cm. long, with blades reaching 6 cm. long by 8 cm. broad; upper leaves smaller, with petioles as short as ·5 cm., and blades 3·5 by 4 cm.; blade divided for two-thirds of its length; setulæ of stipules about 1 cm. long. Inflorescences axillary; lower bract 14 mm. long, upper ones smaller. Ultimate bracteoles subtending male flower broadly ovate, closely glandular dentate, 1·5 mm. long, flower-stalk 1·5 mm. Calyx 3 mm. long. Corolla 5 mm. long, tube 2 mm.; lobes with a very rounded apex; 5 opaque white free wartlike glands above and alternating with the petals. Staminal column (including anthers) 4 mm. long. Female flowers present only in fruiting stage, calyx 5–6 mm. long, limbs ovate to obovately oblong, pubescent, glandular-dentate. Capsule 9 mm. long, seeds whitey-brown, oblong, 7 mm. long.

Near *J. Stuhlmanni* Pax (in Engler's *Jahrbuch*, xxiii. 530), collected by Stuhlmann at Sansibar, which, however, differs in its longer-petioled leaves, with cordate base and acute lobes and smaller male flowers.

Acidanthera Gunnisi, sp. nov. Graminea glabra, caule simplici subcompresso e bulbo globoso tenuiter reticulato; foliis elongatis anguste-linearibus, acutis subrigidis; spica laxa 3–4-flora; spathæ valvis submembranaceis linearibus, interiore angustiore interdum lineari-lanceolata; perianthii tubo longo tenui quam spatha plus duplo longiore, segmentis ovalibus, abrupte apiculatis, basi attenuatis, candidis vel sæpius purpureo tinctis.

Hab. Wagga Mountain, in moisture at 6500 ft., end of February, Mrs. E. Lort Phillips; Dimoleh, Messrs. Gillett & Aylmer.

Corm 1·5 cm. in diameter, scales rather finely reticulate, light brown. Stem stiffish, smooth, green, slender, reaching 8 dm. in length, 2–3 mm. wide. Leaves long and grass-like, from a long narrow membranous sheathing base; with a prominent midrib and two often inconspicuous parallel veins; the largest, near the base of the stem, generally three in number, reaching 8·5 dm. in length; 2·5–4 mm. wide, becoming narrower above; leaves on the upper part of stem shorter. Spathe-valves generally between 4 and 6 cm. long, about 3 mm. broad when folded, greenish tinged with red, the outer subtruncate. Perianth white, or more or less tinged with crimson; tube 10–12 cm. long, 1–2 mm. in diameter, widening gradually above to 4 or 5 mm. at the mouth; segments 3–4 cm. long by about 1·5 cm. broad; anthers 1·2–1·5 cm. long, reaching about half way up the perianth limb. "Very sweetly scented."

Near *A. candida* Rendle (in *Journ. Linn. Soc.* xxx. 404), found by Dr. Gregory on the Athi plains south of Somali-land, but a much finer plant, with larger flowers, and distinguished by its very long narrow-linear grass-like leaves.

Since going to press I have received living specimens of the flower from Mr. Gunnis, with whom it has bloomed at Sevenoaks. The perianth-segments are recurved, with a mucronate apex, white with a very pale rose-purple tinge; the anthers are more deeply tinged with the same colour, a short narrow streak of which is also found at the mouth of the perianth-tube.

SHORT NOTES.

West Gloucester and Monmouth Plants.—*Fumaria pallidiflora* Jord. Plentiful in an old hedgerow by the Severn-bank at Beachley, W. Glos. Recorded for v.-c. 34 with a ? in the last ed. of Top. Bot. —*Geum rivale* L., *Salix repens* L., and *Lastræa Thelypteris* Presl. All in a marsh thicket in Shirenewton parish, Mon., growing with several other plants rare in the county. These three are not recorded for v.-c. 35 in Top. Bot. Mr. Ley, in the *Flora of Herefordshire*, records *Lastræa Thelypteris* as growing on the border of the counties of Hereford and Monmouth.—W. A. Shoolbred.

Euphorbia prostrata Ait. in Hants.— Mr. R. Charles, of Highcliffe, sent me in August last a specimen of an undetermined plant found occurring as a weed in the Purewell nursery-gardens (Mr. M. Prichard), Christchurch, Hants. On my taking it to the British Museum it was identified by Messrs. Britten and Rendle as *Euphorbia prostrata* Ait. This species has not previously been noted in Great Britain. It is known in Europe only as an introduced plant: Toulon and Palermo (Nyman's *Conspectus*). Boissier (in De Candolle's *Prod. Syst. Nat.*), Mr. Rendle kindly informs me, gives its distribution as "in subtropical and tropical America, from Louisiana and Texas to Brazil; Guinea; Sierra Leone; Canary Islands; Bourbon; and Mauritius." In the Museum herbarium is a specimen from Madagascar; also some from Angola and Madeira. Mr. Prichard can only surmise that the seeds may have been introduced into his grounds with tomatoes from Teneriffe, or with waste from a Bournemouth fruiterer's shop. — William Whitwell.

Sisymbrium strictissimum L. — I have to announce the appearance of this plant on the borders of both Lancashire and Cheshire, having been noticed by Mr. Henry Hyde, of Manchester, the past two seasons, between Stretford and Chorlton-cum-Hardy, on both banks of the River Mersey. Though of course a casual, the species will in all probability increase every succeeding year, and therefore it is worth putting on record. It may be known by its yellow flowers in racemes, cylindrical pods, spreading calyx, and lanceolate, undivided leaves. The plant grows 3–4 ft. high, and, Mr. Hyde informs me, was quite conspicuous and well grown in the localities above cited. It flowers from May to July. I have specimens in my herbarium from several European localities; indeed, it is widely spread, according to Nyman (Consp. Fl. Eur. 43), occurring in West and Central Germany, Switzerland, Dauphiny, North Italy, Carniola, Hungary, Transylvania; and also in the Supplement by the same author (1889), Bavaria, Roumania, Bulgaria, Central Russia, and Sarepta (Becker) are mentioned (Suppl. Consp. Fl. Eur. 26).—J. Cosmo Melvill.

Taraxacum lævigatum DC. — This variety grows upon walls in the neighbourhood of Bath plentifully, and well marked by its ovate outer phyllaries, horned or gibbous inner ones, and pale brown achenes. Why is it not included in the *London Catalogue*?—S. T. Dunn.

NOTICES OF BOOKS.

Memorials, Journal, and Botanical Correspondence of Charles Cardale Babington, M.A., F.R.S., F.L.S., &c. Cambridge: Macmillan & Bowes, 1897. 8vo, pp. xciv, 476 (two portraits).

This admirably printed volume is fitly termed "Memorials." It contains the materials for a biography rather than the biography itself. Mrs. Babington, to whose loving care the work is due, modestly refrains from placing her name on the title-page, and contents herself with signing her initials to the preface, and to the short "envoi" which follows the Journal. Her view has been to present under the three heads indicated in the title the various aspects of Babington's life; and although we may regret that she did not see her way to embodying these in one narrative, we cannot but respect her preference for this mode of treating her subject.

Taking these subjects in order, we find in the first place a memoir by Babington's intimate friend, Prof. J. E. B. Mayor, with notes giving much information as to the various botanists and others incidentally mentioned therein. Prof. Mayor was so thoroughly in sympathy with Babington, not only in his learned and scientific tastes, but also in his sincere and earnest though limited views of religious truth, that his appreciation is justly entitled to the position which it occupies in the volume, giving as it does a comprehensive survey of the late botanist's life and character. One sentence—"a still career, all of one piece, has few landmarks"—seems to convey a better idea of Babington's life, as it appeared to the outside world, than its definition in the preface as "many-sided" and "varied in its interest"; but as to this more may be said when his Journal comes under consideration. Among the other memoirs, or "reminiscences," as they are termed, are two of more especial botanical interest—the sketch which appeared in this Journal for September, 1895, and one on Babington's work among British Rubi, by Mr. J. E. Bagnall, which has not, we believe, been previously published. The former of these is the only attempt which has been made to appreciate as a whole the work of the late Professor as it affected the English flora. The other reminiscences are of various kinds, and include letters of sympathy written at his death, which, however consoling to the recipient, can hardly be said to add to our knowledge. They end with a memorandum, hardly in place here, which Babington addressed to the Senate in 1881 against the proposed opening of the Botanic Garden on Sundays.

The Journal, which is prefaced by a curious portrait of Babington at the age of seventeen—the admirable portait taken in later life was, through the kindness of Mrs. Babington, reproduced as a frontispiece to the last volume of this Journal—begins (after a short autobiographical notice) on Nov. 2, 1825, and ends Sept. 10, 1891. As a whole, and regarded from a literary standpoint, it cannot be said to have been worth printing. There are of course interesting notes of rambles taken with byegone botanists who did much to increase our knowledge and promote the study of British botany—Borrer, Winch, George Johnston of Berwick ("one of the nicest men I have yet met with among the naturalists"), Henslow, Edward Forster, John Ball—excursions in the days before railroads, when travelling was done by coach or gig. Notes of the plants collected on these expeditions are often given—sometimes in a form which causes regret that the proofs were not submitted to a botanist for revision, who would have suppressed certain temporary names which now appear for the first time. Perhaps the most readable entries are those recording Babington's visits to Ireland, in which his botanical, archæological, and topographical notes are combined with comments on the work of that curiously futile body the Irish Church Missions, in which, throughout his life, he took a keen and practical interest. The notes on Iceland are also readable enough, but the proof-reader should not have allowed a Professor of Botany to write in one sentence—"mign*i*onette and a small fu*sch*ia." But it seems to us impossible to suppose that such entries as "June 20. My aunt Bedford went to Clevedon. I went by rail . . . . for a few days"; or "Sept. 22. To London and Cambridge by railway," can be of the faintest possible interest to any human being; and the greater part of the Journal, which occupies 258 pages, consists of entries of this kind. The Journal, indeed, as we have hinted above, shows a distinctly limited range of interest: we find nothing to show that art or general literature had any special attraction for the writer, and very little, if anything, bearing upon other topics of importance, apart from those already mentioned.

The "Botanical Correspondence" is the most interesting portion of the book, though even here we find trivialities which a less partial editor would have excluded. Babington was an excellent correspondent; many whose names have since become familiar will recall with pleasure the kind and encouraging letters received in reply to those which, not without some trembling hesitation, they ventured to address to the author of the *Manual*. The letters begin with one addressed to Dr. (afterwards Sir) W. J. Hooker, dated Nov. 24, 1834—a long and interesting one, like that which follows it. *Euphorbia Characias*, *Viola imberbis*, *Leontodon palustre* are the main subjects of the first letter; *Erica Mackayii*, *Crepis tectorum* "of our English authors," *Polygonum Raii*, of the second. As is often the case, one gets a better idea of the man from his own letters than from his biographers or eulogists. It is refreshing to find him writing about a man who was supposed to have nearly destroyed *Trichomanes* at Killarney:—"The *Trichomanes* has been nearly extirpated by a rascal of a gardener. I wish I had him to duck in the lake: I would keep him under till he was just not dead, and then let him recover, and give him another dose"; and it is delightful to find one of the methods traditionally ascribed to the Inquisition commending itself to our Protestant Professor. And how human is this (to Borrer):—"Have you seen Hooker's 4th edition? He has given Christy credit for conjoint work with me. Nothing can be more incorrect. He was out with me on three days during seven weeks, on two of which he was under my pilotage. When you are writing to Hooker you will perhaps incidentally mention that he had next to nothing to do with my work." But it is impossible to refrain from a growl at the constant misprints: Borrer is made to speak of "*Aira caespitosa*, variety Langa" (p. 287)!

It would be impossible to give anything like an adequate notice of the nearly 200 pages of letters which form the really valuable part of this volume. Nor have we any desire to do so; our aim is rather to induce British botanists to obtain the book for themselves. They show conclusively that the keen observation and lively interest, which characterized Babington at the beginning of his career as a student of British plants, persisted to the end; they show also his willingness to place his observations at the disposal of fellow-workers, and his readiness to help them in every way possible. We have already recorded our high estimate of Babington's botanical work, and our appreciation of his character; it only remains to add that no one can read this book without forming a yet higher opinion of his life and labours.

James Britten.

The Royal Gardens, Kew, in all Seasons of the Year. Edited by Mrs. S. Goldney. Dawbarn & Ward [no date]. Price 2s.

The publication of a work dealing with Kew Gardens without an *imprimatur* (or even a preface) from the Director, is in itself an occurrence sufficiently remarkable to deserve notice. Notwithstanding this omission, the publishers have produced a very pretty book. The photographs from which the numerous illustrations have been prepared were taken expressly for the work by Mr. J. W. Mills, who has brought together a charming series of pictures, representing the Royal Gardens in their various aspects; and we imagine the work will have a large sale, especially among foreign visitors, who, in the absence of any proper Guide to the Gardens, will find in this volume a useful souvenir of their visit.

Unfortunately the pictures are not left to speak for themselves, as they are quite capable of doing. We presume Mrs. S. Goldney is responsible for the verses which introduce each month, and it is putting it mildly to say that Mrs. S. Goldney is not a poet. Nor does she seem to be an observer—at least, we never saw beeches behave like this at Kew (or anywhere else):—

> "Have you seen the tall beeches that grow at Kew,
> Uplifting great pillars as sea-cliffs do,
> Shot over with colours of varied hue,
> And feet swathed in carpets of hyacinth blue?
> For that's how the beech trees grow in Kew."

At Kew, too, plants seem possessed of locomotive powers; the bluebells "wander like a flood," the iris "crowds to the brim," the daffodils "clamber up the sloping side" of a hill: only the azaleas are stationary:—

> "Azaleas, azaleas, set in
> A verdant wood;
> Azaleas, azaleas ablaze
> With colour stood."

Not only plants, but birds, the weather, moral reflections, members of the Royal Family, the sun-dial, and other things, receive attention from Mrs. S. Goldney's muse. Even the cry "All out!" forms the subject of a poem; it reminds Mrs. S. Goldney of the first intimation of that nature, which was addressed to Adam and Eve in another garden, of which she "softly asks"—

> "Can Paradise have fairer been than this?"

But the keepers are relentless, as in the earlier instance, and Mrs. S. Goldney, still referring to Adam and Eve, says pathetically:—

> "Disconsolate—as they—we stand about
> The closing gates, when dies the last 'All out!'"

This waiting about, however, is futile; it would be better to hurry to the train. But is it not a strong plea for the earlier opening of the Gardens?

Laboratory Practice for Beginners in Botany. By W. A. SETCHELL, Ph.D. 8vo, pp. xiv, 199. New York: The Macmillan Co. 1897. Price 4s. 6d. net.

WE congratulate Dr. Setchell on this little handbook, intended for beginners "either in the higher grades of the primary schools, or in the secondary schools." With the aid of a lens and a knife, and a plentiful supply of specimens, it conducts us through a well-arranged and useful course of practical study of the morphology and meaning of the morphology of the larger plants. Its scope is well described in the author's prefatory remarks:—

"The writer has had the teachers particularly in mind in arranging the course of study. The seed is taken up first, because it is not only readily obtained, readily studied, and its meaning clear, but it is also one of the most convenient starting-points for a study of the life-history. After a few studies to show how the plants start upon an independent existence, typical stems, typical roots, and leaves are considered, both as to their structure and as to their usefulness to the plant. Then follows the study of the modification of these organs, especially in plants which store away nourishment, which protect themselves from grazing animals, which climb up above their neighbours for light and air; of plants which are robbers or huntsmen, taking their food from other plants or by capturing animals; and, finally, a glance at the different ways in which plants propagate their kind." The directions to the student are clear, and at the end of the book is an appendix for teachers, containing suggestions as to reading, supply of material, its preparation, and the like. We must, however, beg to differ from the author on one point, *viz.* the suitability of Mr. Grant Allen's *Story of the Plants* as a book of reference either for students or teachers. Dr. Setchell is Professor of Botany in the University of California, and therefore it is very natural that the plants selected for study should be those to be easily obtained in the United States of America. The teacher on this side the Atlantic will, however, be able without much difficulty to replace these, where necessary, by indigenous or commonly cultivated species.

A. B. R.

European and N. American Bryineae (Mosses) described by N. C. KINDBERG. Part I. Linkœping, Sweden: Sahlstrœms Bookselling. 1897.

"SUBSCRIBERS are pleased to pay the sum to the publisher, when they have received this first part." This assertion, printed on the cover, has the appearance of a strong recommendation. Was it intended to be taken in a literal sense? and what is "the sum"? In the preface to the second portion of the book we read:—"As the continuation of this treatise, ready as manuscript, depends upon a sufficient number of subscribers (at least 50), the honored subscribers are requested to inform my publishers of their wishes. . . . . . . Prize: 8 swedish crowns or 'kronor' (= 9 shillings, 9 reichsmark, 11 francs) for the first part, Pleurocarpous; for the whole work 20 swed. crowns. The subscribers shall obtain also my 'Genera of european and northamerican Bryineae, synoptically disposed. The whole edition comprises only 200 copies. All can be printed before the fine of next year." From this it appears that the statement on the cover is open to misinterpretation, and that the pleasure of subscribers in paying the "prize" of "20 swed. crowns" has yet to be ascertained. Let us regard it in the light of a prophecy, and politely hope that it may be adequately fulfilled.

As a contribution to the autobiography of the author the following extract is interesting:—"The author was beginning his bryological studies in Sweden already 1851; bryology was his speciality 1879. I have made longer travels for this purpose also in Norway" and other parts of Europe. "My collections have been augmented by contributions from many bryologists. . . . . I wish to thank sincerely my friends and correspondents for valuable assistance, especially D:r Mueller, which had the benevolence to examine the greater part of my new American species (more than 200), and Prof. Macoun, having sent about 7,000 specimens, collected in N. America in long travels during many years." This multitude of new species, published in Macoun and Kindberg's Catalogue of Canadian Mosses, aroused a storm of disapproval in the United States five years ago. The disapproval still prevails; some of the species have been condemned as ill-founded, and as to the majority judgment is suspended. In the States Prof. Kindberg is branded as a splitter of species. On this side of the Atlantic he has not given us much concern; but European bryologists will now have to reckon with his work, and determine how much of his system they are willing to accept or reject.

The book consists of two portions. The first, comprising forty pages, contains the "Genera . . . . synoptically disposed"; the second, 152 pages, the pleurocarpous "Species . . . . synoptically described." The first "is an essay to define all here belonging genera of Bryineae and to dispose themselves in natural families with attention also to exotic genera and species. To clear their natural affinity I have often found that the common habit ('habitus') of the plants indicates the place in the system; it is also a 'criterium' not to depreciate. To state 'a priori' the vegetable organs, of which the characters are to be chosen, does not agree with nature." Characters, constant in one genus, are very variable in others. "Recent bryologists have attached too great an importance to the organisation of the peristome." Hence the author has not pinned his faith too firmly to peristome-characters, but has endeavoured without bias to found his definitions upon the most constant characters afforded by each genus. In this way he has been enabled to burden or enrich bryology with twelve new genera. His generic system is an extension of that initiated by Bruch and Schimper in their *Bryologia Europæa.*

The second part of the work "is an essay to revise and compare all hitherto known species and subspecies of Bryineae, found in Europe and N. America." "I believe that the greatest importance is to attache to the natural affinity of such species as could be joined to common types (subgenera or groups)." The meaning of this is obscure. Possibly "attache" is intended to be a passive infinitive. "It needs . . . . to select characters, peculiar and constant to each genus." "I have not described selected specimens in all their parts but generally omitted such characters, as evidently are too variable." "To facilitate the determination of sterile specimens . . . . I have accurately described the areolation of the leaves and the common habit of the vegetals. My descriptions are not transscribed from other authors but based on my own microscopical researches and studies in nature." Working upon these lines Prof. Kindberg appears to have performed his task carefully and conscientiously. The English of his descriptions at least is clear; but whether the descriptions themselves are sufficiently well defined to be of real use to a practical bryologist remains to be seen. All varieties, as well as the details of synonymy and bibliography, are omitted; and the *Sphagnaceæ* are outside the scope of the work.

A. G.

BOOK-NOTES, NEWS, &c.

At a meeting of the Manchester Literary and Philosophical Society, held on Nov. 30, the President, Mr. J. Cosmo Melvill, announced that the Council had awarded the Wilde gold medal of the Society for 1898 to Sir Joseph Dalton Hooker, in recognition of his eminent services to all branches of botanical science. It is hoped that Sir Joseph will attend a meeting of the Society in March to receive the medal.

Mr. H. E. Brown, of Chico, California, has issued a remarkable list of his collections. We are not quite sure whether this embodies the latest American researches into nomenclature, or whether the printer has been allowed to indulge his fancy without let or hindrance; but it may safely be said that no similar enumeration has been published since the celebrated Kew Seed-list for 1885. Among the genera we note "Paconia," "Nephai," "Thelaspi," "Painassia," "Onotheia," "Oilia," "Suireæ," "Convolvus," "Sibine," "Machaeraulhera," "Peterospora," and the like; "Drasera votundifolia," "Arctub occidentale" (which is somewhat elucidated by the preceding "Arctub obium, Divaricatum") appear among the species; and the recent American fashion of trinominals is followed and extended in such names as "Gathopsis calycina campanulaceæ," "Rhus aromatica, Ait vartrilo Vata," "Trifolium pratense, Tragus, calycanthaceæ." "Kymaplcuram, Greene" is apparently a new genus, but no species is described, nor is there any diagnosis. The synonymy of the author is somewhat striking: *e. g.* "409. Convolvus arvensis, L., Solanum umbelliferum Esch" and "418. Dicentra panciflora, also Frilillaria." If Mr. H. E. Brown's specimens are as remarkable as their names, they should be worth acquiring.

On December 4th the fortieth anniversary of Prof. C. Cramer's joining the staff of the Zürich Polytechnikum was celebrated by a "Kommers," at which he was presented with an address.

Sir Joseph Hooker's great work, the *Flora of British India*, is now complete, a general index, occupying over 300 pages, having lately been issued, with a short prefatory note on the work, from which we quote the following account of its scope:—"I must remind those who may use it," says Sir Joseph, "that it has no pretensions to give full characters of the genera and species contained in it. It aims at no more than being an attempt to sweep together and systematize within a reasonable time and compass a century of hitherto undigested materials scattered through a library of botanical books and monographs, and preserved in vast collections, many of which latter had laid unexamined for half a century in the cellars of the India House, and in public and private herbaria. It is a pioneer work, which, besides enabling botanists to name with some accuracy a host of Indian plants, may, I hope, serve two higher purposes—to facilitate the compilation of local Indian floras and monographs of the large Indian genera; and to enable the phytographer to discuss the problems of the distribution of plants from the point of view of what is perhaps the richest, and is certainly the most varied botanical area on the surface of the globe, and one which, in a greater degree than any other, contains representatives of the floras of both the Eastern and Western Hemispheres."

The index has evidently been compiled with much care, and is by no means, as happens in some cases, a mere running together of the partial indexes issued with each volume. A few omissions will be noted by those who have the Flora in constant use—e. g. *Exacum anamalayanum* Bedd., but this may be accounted for by its incorrect citation in the body of the work; such genera as *Dichondra* and *Blinkworthia*, indicated (iv. 180) as likely to occur, and therefore described, should, we think, have found a place. We are sorry that the incorrect spelling of *Willughbeia* ("*Willoughbeia*"), for which no justification can be urged, and to which we called attention at the time of publication, should be retained; this is the more remarkable because a prefatory note assures us that the index has been collated with the *Index Kewensis*, in which the name is rightly entered as

"*Willoughbeia* Hook. f. sphalm. = *Willughbeia* Roxb." But these are trifles; and we heartily congratulate Sir Joseph Hooker on having brought his work to a satisfactory conclusion. We understand that Sir Joseph will undertake the completion of Dr. Trimen's *Flora of Ceylon;* the work could not be in abler hands.

The last part (November, 1897) of the *Transactions of the Natural History Society of Glasgow* contains biographies of Prof. Thomas King (with portrait) and David Robertson, of whom brief notices have appeared in this Journal. The contents of the part are largely botanical, and include papers on Coll and Tiree plants, by Mr. Symers M. Macvicar, and on the Algæ of Lamlash Bay, by David Robertson; Notes from Galloway by Mr. James M'Andrew, and on the Shape of Leaves by Mr. G. F. Scott Elliot. Mr. G. W. Dod, in an interesting paper on "The Constancy of the Bee," controverts from personal observation the view put forward by some naturalists that bees remain constant to one species of plant during a single excursion.

Botanists who are working at the African Flora received a welcome, if unexpected, Christmas-box in the shape of the long-promised instalment of the *Flora of Tropical Africa*. We hope to notice this resumption of a very important work in our next issue. The first part of vol. vii. of the *Flora Capensis* has also just been issued.

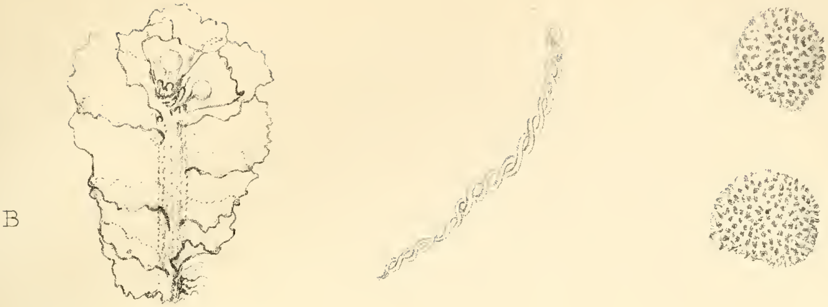
We learn with much satisfaction that our valued contributor Mr. Alfred Fryer has been elected an Associate of the Linnean Society.

Mr. John Humphreys, F.L.S., publishes in the *Bromsgrove Weekly Messenger* for Dec. 11, 1897, a "Flora of Hartlebury Common," Worcestershire, and notes on the flora of the Salwarpe and Droitwich Canal.

The *Annals of Botany* (December) contains a not very pleasing portrait of the Rev. M. J. Berkeley, with a short appreciation by Dr. Dyer, who says, "The task is never an easy one for those of one generation in science to express in a few words the precise nature of the debt which they owe to their predecessors." Mr. J. Lloyd Williams has a paper on the motility of the antherozoids in *Dictyota* and *Taonia*, his observations concerning which were first announced in this Journal last year (p. 361).

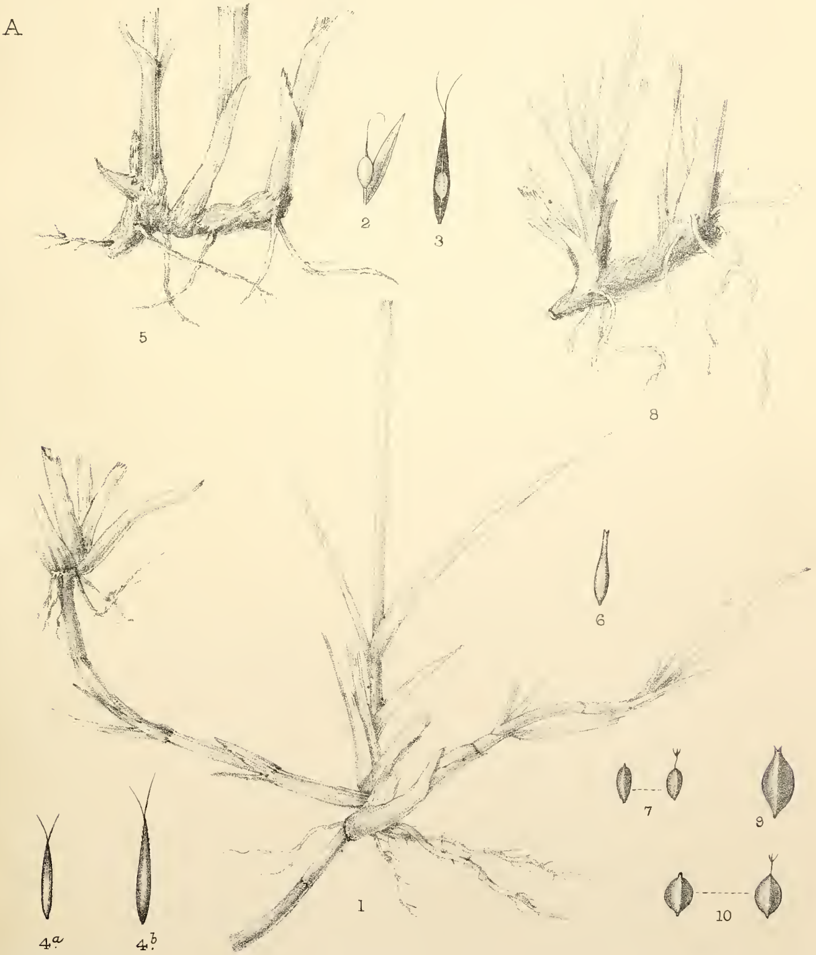
The first volume of a pretty *Botanisches Bilderbuch für Jung und Alt*, by Franz Bley, has just been published by Gustav Schmidt, of Berlin. It contains twenty-four plates, each with nine separate figures; these, although small, are mostly carefully executed and coloured, and convey an accurate notion of the plant. This volume contains the species most likely to be met with in the first half of the year; the figures are not confined to phanerogams, but include some of the commoner fungi. The next publisher who is projecting a popular book on British wild flowers might do worse than arrange for the reproduction of these figures, many of which are, of course, plants common to the two countries. The descriptive text, by W. Berdrow, seems carefully done. The price of the book is 6 marks.

Tab. 382.



E.M.Tindall del.

Fossombronia Mittenii. *Tindall.*


A
5
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6
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10
4.^{a}
4.^{b}

E.F.Linton del.
R.Morgan lith.

West, Newman imp.

1-4. Carex frigida. 5-7. C. binervis. *Sm.* var Sadleri.
8-10. C. binervis.

THE BRITISH CAREX FRIGIDA.

By Edward F. Linton, M.A.

(Plate 382 a.)

In Mr. Arthur Bennett's valuable paper on *Carex* in this Journal (1897, 259), I hoped to see some remarks on *C. frigida* All., which was inserted in our British list some twenty-three years ago (see *Journ. Bot.* 1874, 339); and as this species is passed over in silence, I venture to place on record the result of my investigation into the Scottish plant. It is somewhat remarkable that no one has succeeded with any certainty, since the late John Sadler's discovery in 1874, in gathering Allioni's plant, though Sadler reported it as growing in considerable quantity at one spot, and very conspicuous; the plants supposed to be it by different collectors having, I believe, usually been relegated to a form of *C. binervis* Sm. I gathered such a plant once above Loch Wharral, Forfarshire, where it was growing on a very steep wet rocky slope together with type *C. binervis* Sm.; it appeared to be identical with specimens cultivated from Mr. Sadler's plant and circulated by Dr. Boswell-Syme, but was named "narrow-fruited *C. binervis*" by Mr. Arthur Bennett. I have had in cultivation the Scotch *C. frigida* from the late Dr. F. B. White and also from the Edinburgh Royal Botanic Gardens; this latter (perhaps the former also) is identical with Boswell-Syme's plant, and is no doubt one of Sadler's original roots. It was not till last summer that I saw one of Sadler's own specimens, and satisfied myself that Boswell-Syme's plant and that from the Edinburgh Botanic Gardens were identical with it. I can now take these as the basis of the following comparison, and will call it *C. frigida* Syme for the purposes of this paper.

The plants of *C. frigida* Syme in the Edinburgh Botanic Gardens had become after fourteen or fifteen years a large dense tuft, evidently having no elongate stolons. In my own garden, after about seven years' cultivation, the plant is similarly close-set, having sent out no new rhizome this summer as much as half an inch long; proving in fact to be tufted, not stoloniferous. *C. frigida* All. is described by Koch as "*radice stolonifera*," and by Dr. P. Morthier as having "*souche stolonifère rampante*"; and many specimens in my own herbarium and a fine series lent me by Mr. Charles Bailey testify to its having a creeping root with distinct stolons; the specimens show them from one to three inches in length.

Passing by two or three minor points which appeal to the eye, but look unsatisfactory on paper, *e.g.* the lower leaf-sheaths, I take next the male spikelet, which in *C. frigida* Syme has the glume obovate-oblong and generally obtuse or rounded, varying to subacute in the upper part of some of the spikelets. The glumes of the male spikelet in *C. frigida* All. are of a darker brown colour, lanceolate in shape, gradually acuminate, usually acute, though sometimes obtuse at the tip. The glumes of the female spikelet are very variable in both plants, and almost defy discrimination, but those of *C. frigida* All. are longer and narrower on the whole.

The perigynia of *C. frigida* Syme are $\frac{1}{7}$–$\frac{1}{5}$ in. in length when mature, usually about $\frac{1}{6}$ in. or less, narrowly oval-lanceolate, trigonous, with several faint nerves and two more distinct greenish ones on or very near the two lateral angles; the beaks under a low power appear smooth. The perigynia of *C. frigida* All. are $\frac{1}{5}$–$\frac{1}{4}$ in. long, a trifle more or a trifle less, but commonly $\frac{1}{5}$ in. or a little more, lanceolate, trigonous, with few faint nerves, and the two lateral nerves often indistinct and concolorous, but at times green and evident; the beak under the same low power scabrid on its edges, and often appearing ciliate from the length of the serrulations.

The nut of *C. frigida* Syme is substipitate, $\frac{1}{10}$ in. in length including the very short stipe (which measures about $\frac{1}{70}$ in. in length), trigonous, oval-oblong, narrowed to the base, or it might be described as oblong-obovoid, obtuse above; the base of the style is very commonly twice bent or at least waved, the upper part above the bend being erect. In *C. frigida* All. the nut is long-stipitate, $\frac{1}{8}$ in. long including the stipe, or $\frac{1}{15}$ in. long without it, oval-oblong, compressed trigonous, narrowed rapidly above to a subobtuse point and more gradually below to the slender stipe, which measures about $\frac{1}{20}$ in. Style straight from the base.

Setting on one side the differences between the male spike and the perigynia of the two plants now compared, as being distinctions more open to discussion, there remain two characters of unmistakable importance, which are fully sufficient for my argument. A *Carex* is usually either *tufted*, increasing so slowly as to form no fresh plant, but remaining one single tuft or tussock after several years; or it is *stoloniferous*, sending out underground suckers which bear a barren rosette of leaves the first year, to become rooted detached plants as time goes on. My observations of the growing plant, which was still one dense tuft in the Edinburgh Botanic Gardens after several years, and is entirely without elongate stolons in my own garden, prove that *C. frigida* Syme is of the former sort. An examination of forty herbarium specimens which have the rootstock fairly represented give the proof that Koch's description ("*radice stolonifera*") is correct; thirty-six of them showed part of an old stolon broken off or decayed at the end, or else a new stolon more or less developed. The absence of stolon from the other four specimens proves nothing; as an inspection of a set of herbarium specimens of any other stoloniferous *Carex* (like *C. fulva* Good., *C. teretiuscula* Good., or even *C. arenaria* L.) would show.

The fruit distinction is equally decisive against the identification of *C. frigida* Syme with *C. frigida* Allioni. The nuts of allied Carices are usually somewhat alike; and in the same species there is a remarkable uniformity of shape, size, and colouring of this part of the plant; so much so that any marked difference in the nut is almost bound to point to specific difference. I have examined for the purpose of this comparison the fruit of a large number of specimens of *C. frigida* All. from different countries; from Italy (2), from Styria (1), from the Tirol (5), Baden (1), Vosges (2), S.E. France (2), and Switzerland (5); and I have found the uniformity in the shape of the nut well exemplified. Whenever the nut was mature, the whole length came out $\frac{1}{8}$ in., the nut without the stipe $\frac{1}{15}$ in., and the stipe $\frac{1}{20}$ in. or thereabouts. The stipe was most liable to variation, but the variation was small even here. In *C. frigida* Syme there was of course no series to examine, but a number of ripe fruits have been studied, with the result given above, nut $\frac{1}{10}$ in. or very nearly, scarcely stipitate, the stipe being $\frac{1}{70}$ in. approximately. With such a remarkable divergence in the fruit, it is impossible to regard *C. frigida* Syme as the same species with *C. frigida* All. The wonder is how the confusion should ever have arisen.

Is, then, *C. frigida* Syme a new species, or, if not, to what species must it be assigned? I have already stated that supposed specimens of *C. frigida*, gathered since Sadler's discovery, have usually been relegated to *C. binervis* Sm.; and as there seems to be no nearer alliance, at least in the British list, I proceed to give a comparison of the crucial points:—

	C. frigida All.	*C. frigida* Syme.	*C. binervis* Sm.
Rootstock....	Stoloniferous.	Tufted.	Tufted.
Stem...	8–20 in.	8–30 in.	10–36 in.
Glume of male spikelet	Lanceolate, usually acute.	Obovate-oblong, obtuse or rounded.	Obov.-oblong or obl.-lanceolate, obtuse or rounded.
Perigynia....	$\frac{1}{5}$–$\frac{1}{4}$ in. long, lanceolate, beak scabrid pl. m.	$\frac{1}{7}$–$\frac{1}{5}$ in., narrowly oval-lanceolate, beak almost or quite smooth.	$\frac{1}{7}$–$\frac{1}{5}$ in., ovate-acuminate, beak smooth or nearly so.
Nut	$\frac{1}{8}$ in. long, long-stipitate, subobtuse above, more gradually narrowed below to the slender stipe.	$\frac{1}{10}$ in., substipitate, oval-oblong, obtuse, narrowed below to the very short stipe.	$\frac{1}{10}$ in., substipitate, rather broadly oval-oblong, obtuse above, narrowed below to the very short stout stipe.

It will be seen from the above comparative table that, while *C. frigida* Syme differs from *C. frigida* All. in most of the characters mentioned, it agrees with *C. binervis* in every point except the perigynia, which are much narrower and also less markedly 2-nerved, and in the nut, which is also narrower. It is in fact either a species closely allied to *C. binervis* Sm. or else a variety of *C. binervis*, growing in alpine situations; and since it maintains its distinctive features after years of cultivation, and comes true, as I have proved, from seed, it deserves to be maintained, whether as an allied species or a variety; and I propose to call it *C. Sadleri* (or *C. binervis* Sm.

var. *Sadleri* would perhaps be better) in honour of the botanist who first brought it to light.

Sir J. D. Hooker (*Student's Flora*, 3rd ed. p. 463) observes of *C. frigida*, "a rare instance of an alpine Scotch plant not being Scandinavian"; a remark which may still be true, but not in reference to *C. frigida* Allioni. It is not unlikely that *C. Sadleri* will be found to be an endemic form.

The description of *C. frigida* by Dr. Boswell-Syme (quoted in *Journ. Bot.* 1875, 34, from *Trans. Royal Bot. Soc. Edinb.*, with plate 159) is drawn from descriptions or specimens of *C. frigida* Allioni, some few particulars of Mr. Sadler's plant being appended. The former part ends with a quoted definition of the nut:—"nut brown, longly stipulate (*sic*), elliptical-trigonous, punctate." The only specimen in the Boswell Herbarium of Sadler's collecting is very immature; and if, as is likely, Boswell had no better specimen by him when he wrote the account of it in the *Journal of Botany* (l. c.), this may account for so acute an observer having made no remark on the discrepancy between the description of the nut of *C. frigida* Allioni and the nut of Sadler's plant. The fruit, however, must have been collected fairly ripe on some of the original specimens to account for the drawing of the nut in tab. 159. This represents a mature specimen; but the artist has drawn it upside down, omitted the mucronate tip, and unduly sharpened the substipitate base, which should be short, stout, and truncate.

I would take this opportunity of thanking Mr. Charles Bailey for the loan of his fine series of *C. frigida* All. and continental *C. binervis* Sm.

Explanation of Plate 382 a. — 1. *C. frigida* All., rootstock. 2, 3. Ditto, nut exposed. 4 *a*. Ditto, perigynium, immature. 4 *b*. Ditto, mature. 5. *C. binervis* Sm. var. *Sadleri*, rootstock. 6. Ditto, perigynium. 7. Ditto, nuts. 8. *C. binervis* Sm., rootstock. 9. Ditto, perigynium. 10. Ditto, nuts.

FOSSOMBRONIA MITTENII, n. sp.

By Ella M. Tindall.

(Plate 382 b.)

Plant small, bright yellowish green, slightly larger and less delicate than *Fossombronia cristata* Lindbg., but smaller than *F. pusilla* L. *Stem* 4–5 mm. in length, ½ mm. in width, simple, prostrate, creeping, fragile. *Rootlets* numerous, of medium length, bright reddish purple in colour, giving the stem the appearance of being purple throughout. *Leaves* overlapping each other by about one-third of their breadth, more crenulate than lobed, much crisped, slightly angled, the breadth being greater than the height in the proportion of one to three-fourths, very pellucid, consisting of only one layer of cells throughout the leaf, the cells at the base being irregularly elongated and much larger than those at the edge of the leaf. *Colesula* large for the size of the plant, crenulate, widely open at the mouth, situated either singly or in pairs at the apex of the shoot. *Spores* large, ·047 in diameter, yellowish brown, closely covered with darker brown papillæ; papillæ very numerous, averaging about 110 on the face and edge of each spore, finely pointed, projecting like spines from the edge of the spore, so as to give it a spinulose appearance. *Elaters* narrow, of medium length, with two spiral threads, rarely three; spiral threads loosely twisted. Probably monoicous; all the plants examined bear fruit, but, being fully matured, there are no traces of antheridia.

Habitat. Bank on the side of the road between Parracombe and Braunton, North Devon. Legit W. Mitten, Aug. 1875.

Note.—*Fossombronia Mittenii* belongs to the group of *Fossombroniæ* characterized by the papillose markings on their spores; in this division *F. cæspitiformis* De Not. and *F. Husnoti* Corb. are the only hitherto recorded European species, *F. papillata* St. having been found in Queensland, *F. Wrightii* Aust. in Cuba, and *F. verrucosa* Lindbg. in Algiers. In *F. cæspitiformis* and *F. Husnoti* the papillæ are large, obtuse, comparatively far apart, and number from twenty to twenty-five on the face and edge of each spore. In *F. papillata* the papillæ are smaller and more numerous than in the two previously mentioned species, numbering about eighty on the face of each spore. Compared with *F. Mittenii*, the plant in *F. papillata* is larger, the texture of the leaves coarser, the areolation closer and more rectangular, and the papillæ on the spores larger, more obtuse, and less numerous. *Fossombronia Wrightii* is easily recognized by the dark crimson opaque spores, covered with very dark rounded papillæ, projecting only slightly from the surface of the spore; the papillæ are about equal in size and number to those in *F. papillata*. I have not been able to examine the type gathering of *F. verrucosa* Lindbg., but from Professor Lindberg's description it appears to differ from *F. Mittenii* in the less distinct and less finely pointed papillæ, and the coarse three to four or five spiral threads in the elaters. (This species is not present in all the packets distributed as *F. cæspitiformis* De Not. in Rabenhorst's Hep. Eur. No. 439, gathered by Major Paris at Mouzaïaville, January, 1867. M. Corbière failed to find any species but *F. cæspitiformis* in two packets, and I have been equally unsuccessful in a third.)

Fossombronia Mittenii was found by Mr. Mitten in North Devon in the month of August, 1875, and was then laid aside with other gatherings for future identification. In working through his collection, which he kindly lent me during the past summer, I had the pleasure of identifying it as a new species, and with his permission I now publish it as *Fossombronia Mittenii*.

SOME PLANTS OBSERVED IN CO. WEXFORD, 1897.

By the Rev. E. S. Marshall, M.A., F.L.S.

These notes summarize the results of a short stay at Wexford, from June 8th to 17th. One day was lost owing to a chill caused by my getting wet through in a shelterless place, and having to wait a long time for the return train; and another day's expedition to the Gorey neighbourhood was marred by my having no map of the district, and being misdirected by some of the natives. However, several rare or local species were obtained, including two additions to the Irish list. The marshes of the tidal Slaney will surely repay a more systematic examination; the little that I saw of them convinced me of this. For their kind help in naming critical forms I beg to thank Messrs. Arthur Bennett, H. & J. Groves, Pfarrer Kuekenthal, and Prof. von Wettstein.

Thalictrum dunense Dumortier. Coast south of Ardamine (near Courtown); sparingly in two stations about a mile apart.

Ranunculus pseudo-fluitans Baker. In streams near Gorey; I believe that I also saw it from the train in the Slaney (or its tributaries) in many places from Enniscorthy upwards. A handsome, large-flowered plant, producing its floating leaves freely. "We have come to the conclusion that this name must go to this plant, and not to the form to which it has been applied by Hiern and, following him, by us" (*H. & J. Groves*).—*R. Drouetii* Godron. Near Wexford, Rosslare, and Churchtown.—*R. heterophyllus* Weber. In the foregoing neighbourhoods, and near Gorey. Messrs. Groves have confirmed the naming of *R. Baudotii*, which I reported as plentiful near Wexford Harbour last year. — *R. parviflorus* L. In considerable quantity and certainly wild, on banks at Rosslare; also on a bank near Rosslare Harbour Station, and about half-way between there and Churchtown.

Papaver Argemone L. Rather plentiful on sandy banks, Rosslare.

Fumaria pallidiflora Jordan. In three distinct stations near Wexford, sparingly. — *F. Boræi* Jordan. Roadsides near Gorey; railway near Macmine Junction; rather common on banks, &c., to the east of Wexford; near Churchtown. I had referred these to *F. muralis*, although some of the larger-flowered specimens reminded me of *Boræi;* the correction is due to Messrs. Groves. Probably the Wexford plant reported by me (with some doubt) as *F. muralis* was the same thing.

Nasturtium palustre DC. Damp hollow behind the sandhills near Carnsore Point; scarce.

Brassica Sinapioides Roth. (*B. nigra* Koch). I do not feel the slightest doubt that this is truly wild at Rosslare and near Churchtown.

Lepidium hirtum Smith (*L. Smithii* Hooker). Quite common in this part of the county.

Viola ericetorum Schrader (*V. canina* auct.). Near Gorey; Churchtown; Rosslare.

Polygala oxyptera Reichb. Rosslare. A small-flowered plant, locally abundant on sandy, grassy slopes between Greenore Point and Churchtown, varying with pink and blue blossoms, appears to me to belong here, though tending towards *P. serpyllacea* (which is frequent and typical in the district); it may be one of the named continental varieties. Mr. A. W. Bennett could not pronounce definitely upon the specimens sent to him. *P. vulgaris* was very luxuriant upon banks near Macmine Junction.

Cerastium semidecandrum L. Sandy ground, Rosslare; *C. tetrandrum* was seen here in plenty.

Arenaria serpyllifolia L. var. *Lloydii* (Jordan). Sandy coast between Greenore Point and Churchtown, abundant; also a mile or more to the south of Ardamine.

Sagina ciliata Fries. Sandy field near Rosslare House.

Buda rubra Dumortier. Roadside near Rosslare Harbour, towards Churchtown. *B. rupestris* was noticed at one spot between Greenore Point and Churchtown, and is very fine on rocks at Carnsore Point.

Malva moschata L. Near Macmine Junction and Gorey.

Linum angustifolium L. About Gorey.

Geranium pyrenaicum Burm. fil. Roadsides near Gorey and Wexford.

Erodium moschatum L'Héritier. Rosslare; coast between Greenore Point and Churchtown, close to a cottage garden. *E. maritimum* grows about Courtown, Wexford, Rosslare, and Churchtown.

Trigonella purpurascens Lamarck. Rosslare; about half-way from Greenore Point to Churchtown; near Lady's Island Lake. Very local indeed.

Trifolium striatum L. Between Greenore Point and Churchtown, in good quantity over about half an acre of rocky pasture, and more luxuriant than I remember to have seen it elsewhere; also sparingly on the north shore of Wexford Harbour, perhaps a mile east of the town. — *T. glomeratum* L. In two sandy pastures near Rosslare House; in one of them it was quite plentiful. *T. filiforme* grew with it here, and also occurred at Carnsore Point.

Lotus uliginosus Schkuhr. Near Churchtown.

Prunus Cerasus L. In roadside hedges near Churchtown and Gorey.

Rubus plicatus L. Railway-bank near Macmine Castle.—*R. hirtifolius* Mueller & Wirtgen, var. *danicus* (Focke). About Churchtown and Wexford; frequent. — *R. leucostachys* Schleicher, var. *angustifolius* Rogers. Abundant to the south-east of Gorey, where I also saw a form of *R. corylifolius* which I believe to be var. *cyclophyllus* Lindeberg. The brambles were backward this season, and I could do little with them; but I am sure that this part of Ireland is a good hunting-ground for the batologist.

Callitriche hamulata Kuetzing. Frequent. The form *C. pedunculata* DC. was found in a pool about 100 yards south of Rosslare Harbour Station; although the pedicels are sometimes ¼ in. long, many sessile fruits are present as well on the specimens. — *C. obtusangula* Le Gall. Pools and ditches near Rosslare, frequent;

ditches at Churchtown. — *C. truncata* Gussone. Abundant and fruiting freely in a broad ditch which the railway crosses and in an adjoining pool, between Macmine Junction and Macmine Castle; associated with *C. stagnalis* and *C. hamulata*, and contrasting with them by its dark green colour, as well as by its not rising to the surface of the water. At first sight I took it to be a *Nitella*, and only on dragging out a handful did I become aware of its true nature. A very satisfactory restoration to the Irish list, Messrs. Groves having recently ascertained that the Glansiskin (Co. Cork) plant was *C. hamulata*. I found the fruit to be *sessile* in all the specimens examined.

Œnothera biennis L. An escape at Rosslare; nearly, if not quite, naturalized.

Smyrnium Olusatrum L. Rather frequent about the coast near Wexford, and in hedges near Churchtown; I doubt its being a true native.

Anthriscus vulgaris Bernh. Much more abundant than I had supposed on sandy banks, &c., at and near Rosslare; certainly wild.

Crithmum maritimum L. Carnsore Point.

Œnanthe Lachenalii C. Gmelin. In a small marsh near Wexford Harbour, opposite (east of) the town.

Peucedanum sativum Bentham & Hooker fil. Native at Rosslare, I fully believe.

Valerianella olitoria Pollich, var. *lasiocarpa* Reichenbach. Abundant (apparently to the exclusion of the type) between Greenore Point and Carnsore Point; Rosslare; about Ardamine and Courtown.

Tanacetum vulgare L. Near Wexford; Macmine Junction—obviously introduced.

Petasites fragrans Presl. Near Churchtown; an escape.

Crepis paludosa Moench. Swampy meadows near Macmine Castle, in good quantity.

Statice rariflora Drejer. At the south-west corner of Wexford Harbour, very sparingly.

Myosotis repens G. Don. Near Wexford.—*M. collina* Hoffmann. Churchtown; Rosslare; near Gorey. — *M. versicolor* Reichenbach, var. *pallida* Brébisson. Mr. Bennett suggests this name for a peculiar forget-me-not with uniformly white flowers and pale (yellowish) herbage, which occurs in great quantity on sandy, grassy ground near the sea, north-east of Churchtown, the habit being stiffer and more strict than usual in *M. versicolor*. I have seen just the same plant on the Lizard coast, W. Cornwall.

Euphrasia borealis Townsend. Common on the coast between Greenore Point and Churchtown.

Salvia Verbenaca L. This is quite plentiful at Rosslare, and occurs in greater abundance than I ever saw before in some rough pastures bordering on the coast between Greenore Point and Churchtown.

Lamium hybridum Villars. Sandy hedgebanks in a lane two or three miles east of Wexford; not met with elsewhere.

Plantago Coronopus L. Strong, apparently perennial forms, with villous or woolly scapes and most variable leaf-cutting, occur at Greenore Point; some of them evidently come very near to the var. *ceratophyllon* Rapin, if not exactly that.

Atriplex littoralis L. On a dyke-bank to the south of Wexford Harbour; doubtless a survival from the reclamation of the "slob" lands.

Hippophae rhamnoides L. Two good-sized patches were met with about half-way up the cliffs near Ardamine Church, two or three hundred yards apart. They look thoroughly spontaneous. Can the extensive thickets at Courtown have been derived from this source? Or is the Ardamine growth due to berries brought by birds from Courtown? But for the information given in *Cybele Hibernica*, I do not think that anybody would have doubted its wildness in both places.

Orchis pyramidalis L. Sandy coast south of Ardamine; also at Courtown and Rosslare, but very scarce. — *O. incarnata* L. Damp pastures, Churchtown, with *Ophrys apifera*, which also occurs near Ardamine.

Habenaria bifolia R. Brown. Near Rosslare, sparingly.

Sisyrinchium californicum Aiton. I paid a special visit to the station discovered in 1896, and carefully examined the ground afresh. The plant grows over an area of about eight acres, as near as I can estimate, being confined to the wetter places; it does not occur on the reclaimed lands, which indeed produce hardly anything of botanical interest. Except for the partial drainage caused by small ditches having been dug, the locality does not appear to have been interfered with; stunted heather occurs on the driest parts of the peaty soil, *Orchis incarnata*, a peculiar form of *O. latifolia*, and various Carices and Junci being more or less plentiful. My original opinion that the only source of introduction worth considering was the possibility of its having been purposely sown has been strengthened; and I do not now hesitate, in spite of the enormous *primâ facie* improbability of a purely W. American species being native in S.E. Ireland, to state my belief that we have here an instance of survival from an earlier flora, and not an adventitious plant. It remains to be seen whether *S. californicum* grows in other parts of the south coast; its discovery elsewhere under similar conditions would, of course, greatly strengthen the theory now put forward. It appears to be quite hardy, and has done well on ordinary ground in my garden.

Leucojum æstivum L. This attractive Irish novelty was obtained in a swamp by the river Slaney, a few hundred yards below Macmine Castle, growing under much the same conditions as in the Thames valley, and associated with the plants usually found in such situations; I must have seen from sixty to eighty fine specimens in flower or fruit, and there was nothing in its surroundings to make me distrust its being truly wild. I believe that it will be found in other parts of these marshes, if anybody will take the trouble to search them thoroughly at the proper season.

Lemna gibba L. In ditches at Churchtown.

Potamogeton densus L. Pool by the railway above Macmine

Junction, in small quantity. — *P. interruptus* Kit. Frequent about Macmine Junction, Wexford, Rosslare, Churchtown, and Courtown; always, I believe, the var. *scoparius.*

Ruppia spiralis Hartman. Abundant in a pool by the railway at the S.W. angle of Wexford Harbour.

Zannichellia brachystemon J. Gay? Ditch in a marsh east of Wexford (opposite the town). Plant very slender; stigmas large; styles about one-third the length of the fruit. Also marked as seen at Churchtown.

Eleocharis uniglumis Reichenbach. A peculiar plant with very dark (chocolate-brown) glumes grows in profusion in a damp pasture about midway between Macmine Castle and the Junction, and was also seen near Wexford and Rosslare. It may be Babington's *E. Watsoni*; but no ripe fruit was present.

Carex disticha Hudson. Plentiful in the marshes near Macmine Castle; also by the railway, in a swamp at the S.W. end of Wexford Harbour.—*C. teretiuscula* Good. Marshy meadow east of Wexford, near the *Zannichellia* station. — *C. Goodenovii* J. Gay. A "hassocky" form, plentiful by the Slaney at Macmine Junction, is placed by Mr. Bennett under var. *juncella.* In a peaty marsh-dyke, about half a mile inland from Rosslare village, I came across an extraordinary-looking sedge with *Goodenovii* leaves and inflorescence, but forming elevated peaty tussocks about eighteen inches high and eight or nine in diameter, something like those commonly seen in *C. stricta* and *C. paradoxa*, but smaller. Mr. Bennett places this under *Goodenovii.* Pfarrer Kuekenthal commented on it thus:—"I, too, have not seen *C. vulgaris* so densely tussocky before. If *C. cæspitosa* L. were present at the spot, one might think it a hybrid between that and *C. vulgaris.* But as *C. cæspitosa* is absent from Ireland, probably we have here only a *C. vulgaris* Fr. γ *elatior* Lang, forma *cæspitosa.*" Subsequently he wrote:—"I have already ventured to hint that the combination *Carex cæspitosa* × *vulgaris* has much in its favour; much more than the determination as *C. vulgaris.* I also now find at the top of the ♀ glumes something that recalls *C. cæspitosa*, viz. a slight white scarious border [Yes; but *very* slight.—E. S. M.]. But *C. cæspitosa* would have to be found in the neighbourhood before [we could adopt this view]." I am not satisfied that the plant is *Goodenovii, pur et simple;* apparently it is sterile, but that may well be owing to immaturity.—*C. pendula* Hudson. In profusion in a swamp behind the sandhills, about a mile north of Courtown; associated with this grew *C. strigosa* Hudson, more plentiful than I had ever seen it before. — *C. vesicaria* L. Swamp by the Slaney below Macmine Castle, with *Leucojum.*

Avena pubescens Hudson. On the coast south, of Ardamine; only noticed here.

Poa trivialis L. var. *glabra* Doell (*Koeleri* Syme). Dry banks on the coast about half-way between Greenore Point and Churchtown. I did not see the type there.

Festuca Myuros L. Near Wexford and Gorey.—*F. arundinacea* Schreber. Near Churchtown.

Bromus sterilis L. Plentiful in sandy ground, Rosslare.—*B. commutatus* Schrader. Meadow about two miles south of Wexford; evidently native.

Chara fragilis L. In a small pond near the sea, south of Ardamine; perhaps the var. *delicatula*, but barren, and too dirty to be worth collecting. *C. canescens* and *C. connivens* seem to be extremely local near Wexford; I could only find them for about a hundred yards, in small quantity, whereas *Tolypella glomerata* and *Chara aspera* were abundant over a considerable area.

THE CONYZAS OF MILLER'S DICTIONARY (ED. 8).

By James Britten, F.L.S.

The plants referred to *Conyza* by the older writers have been relegated by more recent workers to many genera, and very few of the earlier species are retained in the genus as now understood. Mr. Hiern informs me that in the first edition of the *Species Plantarum* Linnæus had eleven species of *Conyza*, none of which are now retained therein; they belong to *Vernonia*, *Sericocarpus*, *Pluchea*, *Inula*, and *Neurolæna*. In the tenth edition of the *Systema Naturæ*, published in 1759, Linnæus had two additional species, now referred to *Vernonia* and *Pluchea* respectively; in later publications, posterior to Adanson, he had nine other species of *Conyza*, belonging to *Vernonia*, *Placus*, *Pterocaulon*, and *Phagnalon;* the whole of the Linnean species therefore disappear from *Conyza*.

Miller, in the eighth edition of his *Gardeners' Dictionary* (1768), enumerates eighteen species. Seven of these are identical in name with species described by Linnæus; the remaining eleven appear for the first time. Many of them are based on Houstoun's MSS.; none appear to have been dealt with by subsequent writers, and they are not reduced in the *Index Kewensis*.

Recent papers in this Journal upon Houstoun's and Miller's plants have, I hope, made it clear that the material for determining these can only be found in the National Herbarium. From this material I have been able to identify with certainty nearly all of Miller's species, and I now propose to place on record the results of my investigations. I arrange Miller's names in alphabetical order for convenience of reference.

Conyza Baccharis Mill. Dict. no. 16 = *Pluchea bifrons* DC. Miller cites *Eupatorium conyzoides Sinica*, &c., of Plukenet (Amalth. 80, t. 393, f. 5) as a synonym, but a comparison with Plukenet's specimen in Herb. Sloane xciv. 94, shows that this is not the case. Miller himself was doubtful as to the synonym, for his label on his specimen in Herb. Banks begins "An ? Eupatorium conyzoides *Sinica*," &c. Miller received the seeds from Campeachy, and grew the plant in Chelsea Garden.

Conyza corymbosa Mill. Dict. no. 2 = *Vernonia tarchonanthifolia* Sch. Bip.? Mr. Bennett has identified Miller's plant with De Candolle's *Monosis tarchonanthifolia*, but, in the absence of the type or other material, has added an expression of doubt. I think there is little doubt as to the correctness of the identification, although it may be safer to retain the query. Houstoun's specimen in Herb. Banks (sent from Vera Cruz in 1731) bears the MS. description cited by Miller; there is another specimen from Houstoun in Herb. Sloane ccxcii. 64.

CONYZA PEDUNCULATA Mill. Dict. no. 15. Miller's specimen of this is very poor; it is a *Baccharis*, probably a somewhat abnormal form of *B. rhexioides* H.B.K. It was grown in Chelsea Garden from seeds sent from Campeachy by Robert Millar.

CONYZA SALICIFOLIUS Mill. Dict. no. 6 = *Pluchea subdecurrens* Cass.? This was identified by Mr. Bennett with an expression of doubt similar to that which he expressed as to *C. corymbosa*. As in that case, the identification is probably correct, but it is safer to retain the query. The specimen in Herb. Banks is from Houstoun (Vera Cruz, 1731), and bears his descriptive phrase; another example from him is in Herb. Sloane, ccxcii, 67.

CONYZA SCANDENS Mill. Dict. no. 11 = *Vernonia Schiedeana* Less. Of this we have Miller's specimen from Houstoun (Vera Cruz) in Herb. Banks, and another example from Houstoun in Herb. Sloane ccxcii, 65. On the Banksian specimen is a note in Dryander's hand identifying Miller's plant with *C. tortuosa* L., followed by a note: "See Herb. Cliffort., where the specimen described by Linné is from Miller." The specimen in question is now (like the rest of the plants of the *Hortus Cliffortianum*) incorporated in the National Herbarium, and is undoubtedly identical with the plant from Herb. Miller. *C. tortuosa* has always been obscure—"species mihi omnino obscura!" says DeCandolle, who places it among his "Conyzæ auctorum non satis notæ pleræque verisimiliter è genere excludendæ"; and it may be worth while to clear up its history so far as the material at our disposal will permit.

Conyza tortuosa (Linn. Hort. Cliff. p. 405) is founded on two plants. The first is cited from "Vaill. Act. 1719, p. 396"—*i.e.* Hist. Acad. Sciences, 1719 (Paris, 1721), p. 300 (396 is a misprint). Vaillant's descriptive phrase runs, "Conyza *madagascariensis*, fruticosa, tortuoso caule, Corni folio. *Tsi-mandats*, Flacourt, Hist. 133, no. 71" (1661). Flacourt gives no description, and the small figure on the folding plate facing page 144 (bearing the same number) apparently supplied the material for Vaillant's descriptive phrase. This plant must therefore remain obscure.

The second plant, from which Linnæus drew up his description, was sent him by Philip Miller. The type-specimen in the British Museum Herbarium, already referred to, is named in Miller's hand "Jacea Americana scandens lauri folio scabro floribus spicatis albis Houst. Vera Cruz." Houstoun gives a full description of the plant under this name in his "Plantæ circa Veram Crucem observatæ" (Houstoun MSS. p. 373), and a specimen from him in Herb. Banks (from Herb. Miller) agrees entirely with the Hort. Cliffort. plant. There is a sketch of the same plant in the volume of

Houstoun's unpublished drawings (p. 46) under the name "Conyza scandens."

It seems right to say that a descriptive label in Houstoun's hand identical with Philip Miller's phrase (save in the substitution of "Conyza" for "Jacea")—a substitution explained by Houstoun's phrase in his MSS., "inter Conyzam et Jaceam videtur ambigere"—is attached in Herb. Banks to another Vera Cruz *Vernonia*, not far removed from *V. scorpioides*. This plant, however, does not agree with Linnæus' or Houstoun's description, and the label has no doubt been misplaced. A specimen from Houstoun with his descriptive phrase is found, as has already been stated, in Herb. Sloane ccxcii, f. 65, "ex Vera Cruce."

CONYZA SPICATA Mill. Dict. no. 14 = *Baccharis rhexioides* H. B. K. Dryander has marked through Miller's name on Houstoun's specimen (from Carthagena) in Herb. Banks, and has substituted "*trinervia*"—a name by which, under another genus, specimens of *B. rhexioides* collected by Banks and Solander at Rio Janeiro in 1768 are described in Solander's MSS. William Wood (in Rees's *Cyclopædia*) gave Miller's plant a new trivial name—*carthagenensis*—which is not included in the *Index Kewensis*.

CONYZA SYMPHYTIFOLIA Mill. Dict. no. 10 = *Pluchea odorata* Cass. Houstoun's descriptive phrase—"Conyza Symphyti folio flore luteo"—is attached to his specimen from Vera Cruz in Herb. Banks. A note on the synonymy of *Pluchea odorata* will be found at the end of this paper.

CONYZA TOMENTOSUS (*tomentosis*) Mill. Dict. no. 5 = *Vernonia Deppeana* Less. Houstoun's specimen from Vera Cruz in Herb. Banks has his MS. descriptive phrase cited by Miller, *l. c.* There is another Houstoun specimen in Herb. Sloane ccxcii, 67.

CONYZA TRINERVIUS (*trinerviis*) Mill. Dict. no. 12 = *Baccharis rhexioides* H. B. K. Miller's specimen from Carthagena (Robert Millar) bears his descriptive phrase in his own hand.

CONYZA UNIFLORA Mill. Dict. no. 10 = *Vernonia remotiflora* Rich. The specimen from Herb. Miller bears his descriptive phrase; it is not localized, but was sent (according to the *Dictionary*) from Carthagena by Robert Millar. It was also found by Houstoun, as Miller cites it from his MSS.

CONYZA VISCOSA Mill. Dict. no. 8 (1768) = *C. lyrata* H. B. K. Nov. Gen. iv. 70 (1820). This is perhaps the most interesting of Miller's species, and is the only one which remains in *Conyza*, if that name is to be retained for the genus.* Mr. Hiern has kindly examined the various specimens of *C. lyrata* in the Kew Herbarium, and we have compared Miller's plant with those in the British Museum; and there can be little doubt but that the two species are identical. We have Houstoun's specimens (from Vera Cruz, 1730) bearing his descriptive phrase, and in Herb. Sloane ccxcii, 67; and also a full description of the plant in Houstoun's MSS. Miller's plant having been so completely overlooked, it seems worth while to transcribe his description, and that of Houstoun. Miller's is as follows:—

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* Mr. Hiern is of opinion that the name *Conyza* cannot be retained, and that *Marsea* of Adanson (Fam. ii. 122 (1763)) must take its place. In that case the plant under consideration will stand as *Marsea viscosa*.

"8. CONYZA (*Viscosa*) caule herbaceo, foliis ovatis serratis, villosis, floribus alaribus & terminalibus. Fleabane with an herbaceous stalk, oval, sawed, hairy leaves, and flowers proceeding from the sides, and at the end of the branches. Conyza odorata, Bellidis folio villosa & viscosa Houst. MSS. . . .

"The eighth sort grows naturally at La Vera Cruz, from whence it was sent me by the late Dr. Houstoun; this is an annual plant, which grows in low moist places, where the water stands in winter; it hath an herbaceous branching stalk, which rises about one foot high, garnished at each joint with one oval leaf, fitting close to the branches; these are sawed on their edges, and covered with a white hairy down. The flowers are produced from the side of the branches on slender foot-stalks, each for the most part sustaining three flowers, which are white, and are succeeded by chaffy seeds, crowned with down; the whole plant is viscous, and will stick to the fingers of those who handle it."

Houstoun's MS. description runs thus:—

"Conyza odorata Bellidis folio, villosa, et viscosa. Caules herbacei teretes, erecti, pedales vel bipedales, ramosi. Folia subrotunda, Bellidis minoris formâ, sed profundius dentata, tenera, sine pediculis, vel certo ordine, caulem ramulosq. cingentia. In summis ramulis et caulibus proveniunt flores multi flosculosi, calicibus squamosis contenti, sed flosculis adeo exiguis compositi ut visum fere effugiant. His succedunt semina minutissima pappo instructa. Tota planta molli tegitur lanugine, viscida quoq. est, et gratum spirat odorem. Solo pingui, qualis circa fimeta est, delectatur. Mense Junio 1730 florem fructumq. ferebat."

PLUCHEA ODORATA Cass. (*Conyza odorata* L. Systema, ed. x. 1013, 1759). Under this name two species are included, which were first distinguished by Swartz (Prodr. 112 (1788)), who later (Fl. Ind. Occ. p. 1342 (1806)) gave a fuller description, pointing out clearly the differences between them. Swartz bases his *purpurascens* on "C. major odorata s. Baccharis floribus purpureis nudis, Sloan. Cat. 124, h. [Hist.] i. t. 152, f. 1, male": a reference to Sloane's herbarium, in which the original drawing is preserved, justifies his criticism of the figure. De Candolle, in placing the plant under *Pluchea*, follows Swartz in his determination of Sloane's plant, leaving Linnæus's plant under *Pluchea odorata*.

A reference, however, to the original definition shows that Linnæus took Sloane's plant as the type of his *Conyza odorata*: the reference to Sloane's History stands first in his citations, and he describes the leaves as "serratis subtomentosis acutis"—a character which, as Swartz points out (*l. c.* p. 1342), distinguishes his *purpurascens* from the plant known as *odorata*. Linnæus's other citation is "Plum. ic. 97." The plant figured by Plumier does not accord particularly well with *purpurascens*, but the deeply serrate leaves cannot possibly represent those of the so-called *odorata*. A single detached leaf, however, is referred by Burman in his accompanying text (*l. c.* p. 85) to a variety of the plant figured, and this probably belongs to the species known as *odorata*.

Those who insist on the retention of the oldest trivial name* will thus be compelled to apply *odorata* to the plant hitherto known as *purpurascens*, and to find a new title for that which up to now has been known by the latter name. Fortunately, however, Cassini's description of the species when establishing the genus *Pluchea* makes it clear that under *odorata* he had in view the plant which all writers since Linnæus have intended under that name. His action removes the necessity for so inconvenient a change, unless the priority of the trivial part of the name be insisted on. The plants will stand thus:—

PLUCHEA ODORATA Cass. in Dict. Sci. Nat. xlii. 3 (1826), excl. syn.
Conyza odorata Mill. Dict. ed. 8 (1768) et aliorum, non L.

PLUCHEA PURPURASCENS DC. Prodr. v. 452 (1836).
Conyza odorata L. Syst. x. 1013 (1759) and Herb.! (*fide* Hiern), non aliorum.
Conyza purpurascens Sw. Prodr. 112 (1788).

The following note on an obscure plant may be printed here.

BACCHARIS ARBOREA Linn. Mant. 284. "Habitat . . . insulæ Johannæ sylvis. Koenig." DeCandolle (Prodr. v. 427) places this among his "non satis notæ." Specimens in Herb. Banks from Johanna Island, Robertson, 1772, written up by Solander as *B. arborea* = *Vernonia senegalensis* Less. There is nothing in the original description to contradict this identification.

NOTES ON THE FLORA OF LINCOLNSHIRE.

By the Rev. E. Adrian Woodruffe-Peacock, F.L.S.

As there is no finality in botanical matters, the species ebbing and flowing from natural and artificial causes, my friendly readers must look on these notes with the kindly eyes of those who forgive mistakes where earnest work has been attempted. My efforts during many years have been devoted not merely to compiling a bare list of species found in Lincolnshire (N. 54 and S. 53), but rather to collecting 100,000 notes on geological and drift distribution, with the avowed object of learning why the flora of the two contiguous vice-counties differs as much as it does—practically why we have this flora at all. The relation of species to their geological environment in one part of the county is no sure guide as to what is certainly to be found on the same soil in another spot differing in humidity or dryness, porosity or impermeability, subsoil, &c. With the object of finding out the "why" of our flora in view, and with the Drift maps in hand, I have wandered over the whole county making notes of everything common or rare without distinction; but more especially of the changes in the flora as the varying outcrops of the underlying strata appeared through the surface drift, or approached the surface as a subsoil, so as to affect the flora. A carefully selected series of soil samples have been taken, with full notes, in case it should be thought advisable to test our plant distribution by chemistry in the future.

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* J. A. Murray's warning on this head should not be overlooked:—"Cave, ne prae observantiâ nimiâ in antecessores ex eorum differentiâ specificâ nomen triviale minus commodum emergat." Phil. Bot. Suppl. no. 16 (1792).

It is absolutely impossible in the limits of a short paper to jot down a tithe of the facts observed. They are practically valueless too from being drawn from so limited an area—2,787.140 square miles. But many most interesting facts appear after this geological review. As a sample of these we may note that *Trifolium ochroleucon* has only been found on the boulder clay. *Potentilla argentea*, which ranges widely in other counties, is confined to one limited spot on the Spilsby sandstone. *Herniaria glabra* is the same on one confined spot on the Lincolnshire limestone. I use these geological names in the limited sense in which they are used on the Drift maps. *Cnicus arvensis* cannot grow on peat; but on a thin bed of peat overlying Oxford clay it finds its most congenial home, and where the two are mixed in ploughing it becomes the dread of the farmer. *Urtica dioica* shows a like repugnance to peat, and if forced by circumstances to struggle on in such unpropitious surroundings slowly changes into the variety *microphylla* forma *subinermis*—at least, so Mr. A. Bennett kindly named my specimens. *Festuca pratensis* will only naturally flourish on soils rich in nitrogen, natural or artificial; but it does not die away when sown as *Alopecurus pratensis* and *Dactylis* do, but, just existing, waits for the gradually accumulating fertility of the soil to start it into vigorous life. *Poa annua* is the nursing grass of rich soils, and *Lolium perenne* of the poorer. The latter species seizes on the ground after the passing annuals, and *Carduus*, *Cnicus*, and *Rumex* have had their short but fertility-bringing day. It retains its hold against all opposition till nitrogen has accumulated and better species of grass force it out; even then clinging to every spot it can, where they cannot grow, as footpaths, gateways, slopes down to ponds, roadsides, &c. The following seems to be the recognisable order in which the species follow *P. annua* or *L. perenne;* but the quality of the soil and moisture, and question whether there are the species seeding in the neighbourhood has much to do with it:—*Poa pratensis*, *Cynosurus*, *Poa trivialis*, *Ph. pratense*, *Arrhenatherum*, *Dactylis*, and finally *Alopecurus pratensis* and *Festuca pratensis*. *Arrhenatherum* and *Dactylis* are both shade grasses, and so only come when wood or hedge shade is found near; the former always in limited quantities. *F. elatior* is never found naturally in our pastures and meadows. The best pasture species are seldom allowed to seed by stock, and how they multiply as rapidly as they do I have not yet discovered for certain.

When we have a Geo-topographical Botany, fully up to our present knowledge, it will bristle with facts interesting to the botanist and agriculturist alike.

My notes only refer to the species in the ninth edition of *The London Catalogue.* It should be noted that the genera *Rubus* and *Rosa* are wholly excluded from this review.

The species recorded for the county of Lincoln, excluding the exceptions named, reach the high total of 1108. Of these I regard nineteen to be mistakes, twenty-five as very doubtful, and fifteen as extinct now. If geological evidence is worth anything, about two hundred are truly alien to the soils of Lincolnshire, though many of them are native of Britain. For N. as many as 145 species are recorded, which hitherto have not been met with in S.; and for S. 31, which have not been recorded in N. The varieties on record number 150, excluding anomalies and colour forms, some of which are very interesting. The hybrids are 16.

By mistakes I mean species recorded in print which, on being traced to the specimens, were found mis-named, or for which there was practically other proof of error, as the incompetency or general carelessness of the author who is the first and only authority. I fear many from the doubtful list should be added to the mistakes. The mistakes are:—*Cardamine impatiens, Viola lactea, Cerastium alpinum, Hypericum Androsæmum, Medicago minima, Sedum roseum, Crithmum maritimum, Œnanthe pimpinelloides, Œ. silaifolia, Pyrola rotundifolia, Sibthorpia, Illecebrum, Suæda fruticosa, Orchis purpurea, Aceras anthropophora, Asparagus maritimus, Allium sibiricum, Eriocaulon*, and *Eriophorum latifolium.* The doubtful species are:—*Draba muralis, Thlaspi perfoliatum, Crambe, Dianthus glaucus, D. cæsius, Fœniculum, Galium anglicum, Inula crithmoides, Crepis paludosa, Mentha Pulegium, Thymus Chamædrys, Calamintha parviflora, Chenopodium vulvaria, C. hybridum, C. urbicum, C. botryodes, Polygonum viviparum, Allium Schœnoprasum, Juncus acutus, Elisma natans, Damasonium, Carex teretiuscula, Phegopteris calcarea, Equisetum hyemale*, and *Lycopodium Selago.*

The following species are now almost certainly extinct in their former habitats. There is abundant evidence that they formerly flourished with us, either from localized specimens, or the records of absolutely trustworthy authorities:—*Silene maritima, S. quinquevulnera, Lathyrus maritimus, Cicuta virosa, Senecio paludosus, S. palustris, Sonchus palustris, Schollera, Hypopitys, Statice reticulata, Limosella, Utricularia minor, Malaxis, Liparis*, and *Lycopodium alpinum.*

These have all passed away before a changing environment. The list is being added to gradually but surely. I fear we have lost *Drosera anglica, Peucedanum palustre*, and others, in the last few years.

The only hybrids of any special interest are:—*Cnicus lanceolatus* × *pratensis.*—Mr. Arthur Bennett, to whom I desire to return most sincere thanks for many kindnesses and much help, agrees with me about it. The only specimen there is is in the County Herbarium. *Campanula latifolia* × *Trachelium.*—Specimens in County and Bennett Herbaria; the best in Mr. Bennett's. *Carex distans* × *fulva*, in County Herbarium.

Of interesting varieties we have *Sonchus arvensis* L. *glabra*, an absolutely glabrous form. "It quite simulates *S. maritimus*," as Mr. Bennett says. In County and Bennett Herbaria.

No one need attempt to solve the mysteries of plant distribution in Lincolnshire without some knowledge of our recent geological changes. The artificial boundary chosen by Watson for the N. and S. vice-counties, the river Witham from the Wash to Lincoln and the Fossdyke from that city to the spot where it touches the border of Nottingham, is a great natural boundary which existed before the Ice Age. The boulder clay outcropping from below the recent river gravel deposits of the Trent valley proves that it changed its course in late geological times. The line of its ancient gravels prove it to have flowed along the present course of the Witham from Lincoln. Yet it can hardly be supposed to have definitely taken its present course till historical times, as even now it has to be prevented from passing off some part of its flood-water through the Lincoln gap and along the Witham channel by a bank at Spalford in Notts. The wide gap cut by water in the limestone hill at Lincoln proves the width and power of the ancient stream that flowed unembanked as the boundary between the N. and S. vice-counties. At some time previous to the great ice age too, the whole of the cretaceous strata and the Kimeridge clay of the upper oolite were denuded down to the Oxford clay of the middle oolite throughout the great Lincolnshire fenland. The recent deposits lying on this Oxford clay floor, in order from the lowest upward, are boulder clay, gravelly sand, ancient peat, alluvium, and, in a few stops in N., modern peat. The soils of the great fenland are silt with a fringe of old peat as the land rises to the upper ground. The sea-coast of N., from the mouth of the Humber to that of the Wash, are fringed with blown sea-washed sands where silt is not deposited. There is no such sand-band in S. As soon as the shore is banked up with sand silt brought down by the fen rivers is deposited by the spring tides, and the "fitty" or saltmarsh flora is the result in S.; and at the mouth of the Humber, and along the northern shore of the Wash in N.

Sandy-shore species found in N. for which there is no proper habitat in S.:—*Thalictrum dunense; Ranunculus Baudotii* and varieties—sand-loving, I suppose, or I cannot understand its absence from S.; *Glaucium flavum*, an erratic uncertain species with us; *Cakile maritima, Cerastium tetrandum, Sagina maritima, Lathyrus maritimus, Eryngium maritimum; Senecio viscosus*, confined to a very limited area on the sand-band,—a new introduction perhaps; *Erythræa pulchella, Volvulus Soldanella, Atriplex lacinata, Salsola, Hippophae, Euphorbia portlandica*, confined to one stop; *Ammophila arundinacea, Festuca arenaria*, and *Elymus arenarius*.

Peat fen species found in N., for which there never was much habitat, and now is practically none in S.:—*Lathyrus palustris, Drosera anglica, D. intermedia, Peucedanum palustre, Senecio palustris, Sonchus palustris, Potamogeton coloratus, Cladium jamaicense*, and *Lastræa Thelypteris*.

Moorland and moorland pool-loving species, which cannot always be discriminated from fen land species, found in N. and not yet recorded for S., suitable habitats being very restricted :—*Hypericum Elodes*, *Schollera*, *Andromeda*, *Centunculus*, *Littorella* if with us still; *Empetrum*, extinct, I fear; *Epipactis palustris*, *Habenaria bifolia*, *Eleocharis multicaulis*, *Scirpus cæspitosus*, *S. fluitans*, *Rynchospora alba*, *Eriophorum vaginatum*, if not extinct; *Carex elongata*, *C. curta*, *C. filiformis*, if still with us; *Agrostis canina*, *Apera Spica-venti*, *Deschampsia discolor*, *Festuca myuros*, *Lycopodium inundatum*, *L. clavatum*, *L. alpinum*, *Selaginella*, *Chara polyacantha*. All now rare with us, bordering on disappearance or extinct.

Lime-loving species in N. not yet found in S. :—*Thalictrum collinum*, a species with a northern range, I imagine; rare with us. *Ranunculus sardous*, widely spread. *Stellaria nemorum*, northern type. *Hypericum montanum*, in woods west of Brigg; northern. *Veronica montana*, *Ophrys muscifera*, *Maianthemum*, if a native; *Colchicum*, north-west only. All rare and local. Some from the next list might be added.

Other species for N. not yet recorded for S. :—*Cerastium semidecandrum*, *Trifolium maritimum*, *Vicia lathyroides*, *Potentilla argentea*, *Chrysosplenium alternifolium;* the other species is found in S. *Selinum Carvifolia*, a true native if there ever was one. *Inula Conyza*, *Bidens cernua*, the other species is found in S. as well as N. *Hypopitys*, *Lysimachia thyrsiflora*, *Orobanche major*, a species I cannot understand. *Chenopodium murale*, *Atriplex Babingtonii*, *A. pedunculata*, which has not been found for eleven seasons. *Salicornia appressa*, once found; sp. Herb. Bennett. *Salix pentandra*, surely this must be for want of records; it is so widely distributed in N. *Epipactis media ; Crocus nudiflorus*, very rare, river-borne from Notts. (?). *Juncus maritimus*, *Potamogeton acutifolius*, *Scirpus Tabernæmontani*, *S. rufus ; Carex pulicaris*, not found for many years; *C. distans*, *C. extensa*, *Spartina stricta*, *Melica nutans*, *Asplenium Trichomanes*, *Polystichum lobatum*, *P. angulare*, *Chara contraria*, *Tolypella glomerata*, and *Nitella opaca*. Nearly all local and rare.

Species recorded for S. and not for N. :— *Viola stagnina*, *Linum perenne*, south-west only. *Caucalis arvensis*, practically confined to the southern silt, but with a wide range there. *Hypochæris maculata*, on limestone only. *Gentiana Amarella* var. *præcox*, the same. *Antirrhinum Orontium*, north-west, very rare. *Melampyrum cristatum*, growing very rare indeed, only in south-west. *Stachys germanica*, if with us still. *Herniaria glabra*, local but common. *Beta maritima*, if it is a true native. *Thesium humifusum*, on limestone ridge nearly to Lincoln. *Euphorbia amygdaloides*, in the extreme southern woods. *Epipactis violacea*, if the species is rightly named, on cornbrash only. *Potamogeton decipiens*, *P. angustifolius*, *Hordeum sylvaticum*, and *Tolypella prolifera* ; mostly very rare and local.

Species worth noting found in N. and S. :—Both varieties of *Spergula*. *Bupleurum tenuissimum*, *Carum segetum*, not uncommon. *Dipsacus pilosus*, I do not understand the range of this species. *Senecio paludosus*, this, though found in S., is practically only a N. species. *Pyrola minor*, the only species we have; it is growing rare and dying out. *Cuscuta Epithymum*, very rare. *Limosella*; *Utricularia minor*, extinct, I fear. *Verbena*, thinly but widely spread. *Scutellaria minor*, growing rarer. *Teucrium Scordium*, extinct in N., if not in S. *Ilex*, *Fraxinus*, *Ulmus*, *Quercus*, *Fagus*, *Salix*, *Pinus*, and *Taxus* have all been found under the peat. The *Ilex* was sub-fossilized. *Stratiotes* is still widely distributed. *Spiranthes autumnalis* must be river-borne in seed, or its distribution is inexplicable. *Iris fœtidissima* is very rare. *Eleocharis acicularis* is the same.

Notes on aliens N. and S. would form a long paper by themselves. We are gaining faster than losing, strong-growing new species taking the place of old ones. *Clematis* is an interesting one. *Asparagus altilis* has been with us three hundred years. The aliens confined to N. I can name here are *Cyclamen*, *Teucrium Chamædrys*, *Mercurialis annua*, *Acorus*, and *Phegopteris Dryopteris*, if it is one. Interesting S. aliens are *Limnanthemum*, *Salvia pratensis*, *Viscum*, and *Cyperus longus*.

The County Herbarium is within a few species of being quite perfect: it contains many extinct and very rare plants, and anomalies and colour forms of all kinds, besides a widely selected series of type forms from N. and S.

THE DISTRIBUTION OF BRITISH MOSSES.

By E. Charles Horrell.

For some time past it has seemed desirable that the comital distribution of the British Mosses should be worked out in the way that the distribution of the Flowering Plants was done by Watson. Up to the present the moss distribution has only been worked out, and that but incompletely, in the *London Catalogue of British Mosses*, ed. 2, for the eighteen Watsonian provinces. With the object of seeing how far the lists of Mosses already published would enable me to compile a census of the 112 Watsonian vice-counties, I have looked through most of the magazines, County Floras, Proceedings of Local Natural History Societies, the Botanical Record Club's Reports, &c., in the library of the British Museum, and find that fairly good lists have been published for about fifty vice-counties. There are therefore about sixty-two vice-counties in Great Britain for which I can find no lists of the commoner mosses. From the following vice-counties I have found no satisfactory lists:—

4. N. Devon.
5. S. Somerset.
6. N. Somerset.
7. N. Wilts.
10. I. of Wight.
13. W. Sussex.
22. Berks.
24. Bucks.
27. E. Norfolk.
28. W. Norfolk.
29. Cambridge.
31. Hunts.
33. E. Gloucester.
34. W. Gloucester.
41. Glamorgan.
42. Brecon.
43. Radnor.
44. Caermarthen.
45. Pembroke.
46. Cardigan.
47. Montgomery.
50. Denbigh.
51. Flint.
56. Notts.

58. Chester.
60. W. Lancashire.
66. Durham.
67. Northumberland.
68. Cheviotland.
69. Westmoreland & Lake Lancashire.
74. Wigton.
75. Ayr.
76. Renfrew.
77. Lanark.
78. Peebles.
79. Selkirk.
80. Roxburgh.
81. Berwick.
82. Haddington.
83. Edinburgh.
84. Linlithgow.
86. Stirling.
87. West Perth.
88. Mid Perth.
89. East Perth.
91. Kincardine.
92. S. Aberdeen.
93. N. Aberdeen.
94. Banff.
95. Elgin, &c.
96. Easterness.
97. Westerness.
98. Main Argyle.
99. Dumbarton.
100. Clyde Islands.
101. Cantire.
102. South Ebudes.
104. North Ebudes.
105. West Ross.
106. East Ross.
107. E. Sutherland.
108. W. Sutherland.
109. Caithness.
110. Hebrides.
111. Orkney.
112. Shetland.

It is obvious that one collector cannot investigate the moss flora of more than a few of these districts, and the aid of all bryologists is confidently asked in this work. It is not likely that I shall receive the lists which will enable me to compile the census in less than two or three years, but should much like to find a moss-student in each vice-county who would undertake during that time to prepare a list of his district. I have already received lists or offers of assistance from correspondents in the following vice-counties:—

5. S. Somerset.
6. N. Somerset.
9. Dorset.
11. S. Hants.
14. E. Sussex.
17. Surrey.
18. S. Essex.
20. Herts.
25. E. Suffolk.
26. W. Suffolk.
32. Northampton.
33. E. Gloucester.
34. W. Gloucester.
40. Salop.
42. Brecon.
43. Radnor.
48. Merioneth.
49. Carnarvon.
55. Leicester.
57. Derby.
58. Chester.
61. S.E. York.
62. N.E. York.
63. S.W. York.
64. Mid-W. York.
65. N.W. York.
66. Durham.
72. Dumfries.
73. Kirkcudbright.
74. Wigton.
87. W. Perth.
97. Westerness.
98. Main Argyle.
103. Mid Ebudes.

It would add very greatly to the value of the lists if voucher specimens were also sent, with notes of subsoil, altitude, &c. These specimens I would return as soon as they had been submitted to competent authorities, or would, if preferred, send other mosses in exchange. Mr. H. N. Dixon and Mr. E. M. Holmes have already kindly offered to aid me by examining any doubtful or critical species.

I am using Mr. Dixon's "*Handbook*" *Catalogue* as the basis of this work, and would like to suggest that much help might be given me if each bryologist went through his herbarium and entered on the blank leaves of an interleaved copy of that Catalogue the numbers of the vice-counties from which he has specimens of each moss. This, even for a large collection, would not take very long, and would afford a very large mass of information for my purpose. Unfortunately many specimens in herbaria are not sufficiently accurately localized to enable one to be certain of the county or vice-county: *e. g.* Teesdale alone is of no use as a locality for county distribution, as the north bank of the Tees is in Durham, and the south in Yorkshire. Such doubtful localities should be altogether omitted.

I shall have much pleasure in hearing from any bryologist who can help me in either of the ways suggested, and shall be glad to send a list of the 112 Watsonian vice-counties, with the boundaries in the cases where the county is subdivided, as given in Watson's *Cybele*, vol. iv. p. 139, 1859, to any one wishing it. I shall also have pleasure in sending to any one details of the moss-lists I am acquainted with for any particular vice-county. My address is—44, Brompton Square, London, S.W.

SHORT NOTES.

CATHARINEA HAUSKNECHTII (Jur. Milde) Broth. NEAR LIVERPOOL. —I have great pleasure in adding the above moss to the Liverpool florula (and I think also to the flora of the county), excellent fruiting specimens having been found on Warbreck Moor by my son, Harold Wheldon. It grew in deep, moist hollows, accompanied by *Dicranella heteromalla*, *Anisothecium rubrum*, *Barbula brevifolia*, *B. unguiculata*, *Tortula aloides*, and other common pelophilous species.—J. A. WHELDON.

HYGROMETER MADE WITH ERODIUM AWNS.—I have found the awns of *Erodium cicutarium* an excellent substitute for those of *Stipa* in the Darwin transpiration hygrometer. *Erodium* is very common in some parts of California. A piece of iron wire bent in the form of a tripod serves to support the awns in the crystallizing dishes better than the mechanical cross-bars that were supplied some time ago. The seed on the awn is easily attached to the tripod by a small bit of wax or paraffin with a hot needle. The tripod has the advantage that it may be instantly revolved to any position inside the dish without throwing the awn out of the axis of the vessel. The *Erodium* awn carries its own pointer. On the whole, less dexterity is required in its manipulation, and it has been shown to be more sensitive to humidity than the longer awns of *Stipa*.—WALTER R. SHAW in *Bot. Gazette*, November, 1897, p. 372.

CORNWALL AND DEVON PLANTAGO FORMS.—After reading Mr. E. G. Baker's critical survey of the European forms and varieties of *Plantago Coronopus* L. (Proc. Dorset N. H. & A. F. C. xvii. 87), I have taken the opportunity of collecting for comparison a series of sea-side forms from Bude, N.E. Cornwall, and Braunton Burrows, N. Devon. At the former the species is plentiful on the rocks and shingle at the foot and on the downs at the top of the cliffs, showing great diversity in size and leaf-outline. The commonest form has a perennial root and narrow pinnatifid leaves. An abundant simple-leaved form is the young state of this (first year or two); the very rare mature specimens with entire leaves may be var. *integrata* G. & G. The form *bipinnatifida* of Wirtgen, with bipinnatifid leaves from the first, is common and easily distinguished, especially when the plants are young. Two forms occur with the rachis broad: (1) smooth fleshy plants corresponding to var. *maritima* G. & G.; (2) those having ascending hairy leaves with broader pinnæ (thus appearing to be coarsely serrate)—perhaps var. *latifolia* DC. A plant corresponding to var. *pygmæa* Lange is plentiful on the Bude Downs and at Braunton Burrows. With the exception of var. *integrata* G. & G., these forms are easily recognized. Two very distinct forms of *P. maritima* L. occur at Bude: (1) a large plant with simple root, and flat, linear-lanceolate leaves; (2) one with many tufts of curved linear leaves at the ends of a branched rootstock, forming together a small compact cushion. But for their obtuse bracts they correspond respectively to specimens of *P. serpentina* Vill. and *P. carinata* Schrad., from the Mediterranean. A form of *P. lanceolata* L. with spreading teeth to its leaves, known on the Continent, but not hitherto, I believe, in England, occurs at the same place.—S. T. Dunn.

Mentha Notes. — The following are M. E. Malinvaud's notes on specimens of British Mints recently submitted to and kindly examined by him:—*Mentha rotundifolia* L. Near Bossington, W. Somerset, Aug. 1893. "Groupe des *Rotundifoliæ legitimæ*. *M. meduanensis* Déségl. et Dur. in Bull. Soc. roy. de bot. de Belgique, t. xvii. p. 310. Malvd. Menth. exsicc. No. 104. Saltem proxima." — *M. sylvestris* L. By the Darent, near Eynsford, W. Kent, 27/8/1891, coll. J. Groves, comm. E. S. Marshall. "Foliis irregulariter dentatis. An proles hybrida?"—*M. sylvestris* L. Near Westenhanger, E. Kent, 15/7/1893, legit E. S. Marshall. "*Silvestres legitimæ*. *M. silvestris* L. Stam. incl. (*subfemina* Schultz). *M. viridis* γ *canescens* Fries, Gren. et Godr."—*M. viridis* L. Marsh near Albury, S.W. Surrey, July, 1893. "*Silvestris glabra*. *M. viridis* L. Stam. incl. Cf. *M. viridis* var. γ *piperella* Court. et Lej. Comp. flor. belg. — *M. piperella* Opiz."—*M. sylvestris* L. intermed. to *M. viridis* L. Northbrook, Surrey, Sept. 1894. "Rursum et accurate inquirenda! Forme curieuse. Bractées velues comme dans le type *silvestris;* le reste est du *M. viridis* L., auquel je rattache la plante. Plante extraordinaire."—*Mentha* sp. Among the sand dunes, Braunton Burrows, N. Devon, Aug. 1896. Totally procumbent. "*M. aquatica* var. *hirsuta* minor monocephala, for. reducta."—*M. sativa* L. Bramley Canal, S.W. Surrey, Sept. 1893. "*Sativæ*, proles hybrida ex *aquat.* et *arv.* *M. sativa* L. p. p. Cf. *M. aquatica* var. *verticillata*, mult. auct. *M. subspicata*, nonnull. *M. angustifolia* Schreb."—*M. arvensis* L. var. *Nummularia* Schreb. Corfe Mullen, Dorset, 28/9/1891, ex herb. E. F. Linton. "*M. arvensis* forma major. Cf. *M. Hostii* Bor. Fl. Centre (saltem proxima)." —The form from Braunton Burrows (*M. hirsuta* Huds.) has a very distinct appearance in consequence of its procumbent habit, the whole plant being tightly pressed upon the sand, and the leaves all in one plane. That it is merely a variation due to environment is suggested by its gradually passing into the typical form where there happens to be a tuft of rushes or other shelter.—S. T. Dunn.

NOTICES OF BOOKS.

Die natürlichen Pflanzenfamilien . . . von A. Engler und K. Prantl. i. Teil, 2 Abteilung [Algæ]. Leipzig: Engelmann. 1897.

The volume devoted to Algæ in Engler and Prantl's great work is now completed. The *Conjugatæ*, *Chlorophyceæ*, and *Characeæ* are dealt with by Dr. Wille, the *Phæophyceæ* by Dr. Kjellman, and the *Rhodophyceæ* by the late Dr. Schmitz, edited by Dr. Hauptfleisch and Prof. Falkenberg. The *Conjugatæ* are divided as usual into the three natural orders—*Desmidiaceæ*, *Zygnemaceæ*, and *Mesocarpaceæ;* the *Chlorophyceæ* into three groups—*Protococcoideæ*, *Confervoideæ*, and *Siponeæ;* and a plan is given of the relation which the various natural orders of these groups bear to each other. In addition to the diagnosis of large genera, such as *Ulva*, *Œdogonium*, *Caulerpa*, &c., Dr. Wille has indicated the subdivisions into which the genus is divided, and given a type of each such subdivision. It is to be regretted that the genus *Chlorodictyon* has found its way into the natural order *Caulerpaceæ*, as it is well known to be a lichen; *Chlorodesmis* was shown to be but a state of *Avrainvillea* by Messrs. Murray and Boodle in this Journal for 1889. Among the genera of uncertain position placed at the end of *Codiaceæ* is J. E. Gray's *Codiophyllum*, which belongs to *Florideæ*, and was sunk by Dr. Agardh into Kützing's *Thamnoclonium*.

Dr. Kjellman, in his treatment of the *Phæophyceæ*, follows the system of classification published by him in his *Skandinaviens Hafsalgflora*, 1890, but in the reverse order. He divides them into two groups—*Phæosporeæ* and *Cyclosporeæ*. The former he subdivides into *Zoogonicæ* and *Acinetæ*, *Zoogonicæ* containing all the natural orders of *Phæosporeæ* except *Ptilopteridaceæ*, which is placed by itself in *Acinetæ*. Dr. Kjellman remarks on the impossibility of forming a correct estimate of the position of the natural orders in *Phæosporeæ*, owing to our lack of complete knowledge concerning the reproductive organs of many of the genera. Much investigation has yet to be done in this direction, though fresh light has been thrown lately on several species of *Ectocarpaceæ* by the valuable work of M. Sauvageau, and on *Taonia* and *Dictyota* by Mr. Lloyd Williams. Dr. Kjellman has omitted to mention the important link between *Fucaceæ* and *Laminariaceæ* which was discovered in 1892 by Miss Mitchell and Miss Whitting in the genus *Splachnidium*. This genus had till then always been classed among *Fucaceæ*, but the examination of its fruits showed that the supposed oogonia were in reality zoosporangia growing in conceptacles—a distinct connection between the *Phæosporeæ* and *Cyclosporeæ* of Dr. Kjellman. This announcement, published in the *Phycological Memoirs*, received interesting confirmation a few months later from Mr. Laing of New Zealand, who published a note on *Splachnidium rugosum* Grev. in the *Transactions* of the New Zealand Institute.

It may be noted in passing that the position of *Splachnidium* as type of a new natural order—*Splachnidiaceæ*—has not been recognized by Dr. De Toni in the volume on *Fucoideæ* of his *Sylloge*

Algarum, published in 1896. Many of the figures are original, and others are taken from works not easily accessible to many students. They add largely to the usefulness of this volume.

The expounding of Prof. Schmitz's new classification of *Rhodophyceæ* has been awaited with interest. In 1889 he published the outlines of it, without explanation, in *Flora*, and it is only now that phycologists are in a position to criticise the new system in detail. The premature death of this able investigator—nearly three years ago—delayed the publication of his work, but his friend Dr. Hauptfleisch has completed it on the lines laid down by Dr. Schmitz. The *Rhodomeleæ* are dealt with by Dr. Hauptfleisch and Prof. Falkenberg.

The *Rhodophyceæ* are divided into *Bangiales* and *Florideæ*, the first containing three natural orders—*Rhodochætaceæ*, *Compsopogonaceæ*, and *Phoreaceæ*. *Florideæ* is subdivided into four main groups, differing in the mode of development of the fertilized carpogonium. The system of classification hitherto followed was founded by Dr. Agardh on the formation of the mature cystocarp, without regard to its development. The practical difficulties of Dr. Schmitz's system are obvious, for but few plants can be easily obtained in such successive stages of development as to determine into which of these four divisions it falls. Until that point is decided, nothing but previous knowledge of the different genera can possibly be of any assistance. To a beginner in the systematic study of algæ, such a system is discouraging. In some cases the natural orders associated by Prof. Agardh still fall together, and many of them contain the same genera. The relationship of *Rhodomelaceæ* and *Ceramiaceæ* is recognized, and both orders are placed in the third of the four large groups, *i. e.* *Rhodymeniales*. Several genera hitherto regarded as belonging to *Rhodomelaceæ* are banished to other orders, while *Laurencia*, *Cladymenia*, and *Cœloclonium* are included in *Rhodomelaceæ*. Some new genera are also created, and Harvey's *Chondria* reappears to take the place of Dr. Agardh's *Chondriopsis*.

In the diagnosis of *Gattya* on p. 499 an odd mistake occurs. The cystocarps are minutely described, and a few lines lower a remark is made to the effect that the position of the genus must remain uncertain, owing to the cystocarps being unknown!

In *Grateloupiaceæ* J. E. Gray's *Codiophyllum*, referred to above, is revived. It had been sunk by Dr. Agardh into *Thamnoclonium* Kütz, but its one species is now separated off again on account of a difference in the cuticular structure.

Such work as this of Prof. Schmitz has necessarily required an immense amount of minute examination of algæ in various stages of development, and it seems a pity that similarity of vegetative or other characters does not play a larger part in the diagnoses of his main groups. The exclusive consideration of one part of any plant, even though it be of such importance as the development of the fruit, is somewhat unsatisfactory; and it remains to be seen whether the new system is founded on a firm enough basis to stand entirely in its present form.

E. S. B.

Le Fumariacee Italiane. Per Leopoldo Nicotra. Firenze, 1897. 8vo, pp. 78. Prezzo L. 3.50.

This pamphlet is an elaboration of the Italian *Fumariaceæ* for the continuation of Parlatore's *Flora Italiana*, and follows on the general lines of that well-known work. The synonymy seems carefully worked out both for the species and varieties, and figures are quoted in every case where these are obtainable.

One or two points in connection with the work are of special interest to British botanists. The genus *Corydalis* is retained in preference to Scopoli's earlier *Neckeria*, nor do we find that Signor Nicotra thinks it necessary to make any reference to the older name. In the genus *Fumaria* the divisions adopted are those indicated in Hammar's monograph, the Italian species falling under three series:—(1) "Flores angusti. Petala exteriora margine alato eorum apicem non attingente. Interiora a medio ad apicem sursum curvata. Achenia lævia aut sublævia." (2) "Flores ampli. Petala exteriora margine alato eorum apicem attingente. Interiora a medio ad apicem sursum curvata. Achenia magna, vulgo insigniter tuberculata, carinato-compressa." (3) "Flores parvi. Petala exteriora marginibus latis, patulis, summum apicem attingentibus cincta. Interiora lata, parum curvata. Achenia parva, parum rugulosa vel etiam sublævia."

To the first series belong *F. capreolata* L., *F. Reuteri* Boiss., and *F. muralis* Sond., but not, be it noted, *F. Boræi* Jordan. *F. pallidiflora* Jordan becomes *F. capreolata* L. *β flavescens* Nicotra, the characters given for this variety being "floribus minoribus, pallide flavescentibus, laxis." *F. confusa* Jordan is *F. muralis* Sonder, *β serotina* Nicotra, the characters given being "pedicellis brevioribus, acheniis rugulosis." To the second series belong *F. Gussonii* Boiss., *F. bicolor* Somm., *F. agraria* Lag., and *F. flabellata* Gasp. *F. Boræi* Jordan is *F. Gussonii* Boiss. *γ Boræi* Nicotra, with the following varietal character assigned: "elata, cirrhescens, potius viridis, racemis laxifloris, pedicellis bracteas subæquantibus, floribus violaceis, acheniis basi angustatis." As members of the last series we have *F. officinalis* L., *F. Wirtgeni* Koch, *F. Vaillantii* Lois., *F. Schleicheri* Soy.-Will., *F. parviflora* Lamk., *F. micrantha* Lag., and *F. Kraliki* Jord. Signor Nicotra is doubtful whether the *F. densiflora* DC. Cat. Hort. Monsp. 113 (1813), is the plant we at present understand by that name; he has therefore used the name *F. micrantha* Lag., which was published three years later.

On the lines of this revision, the nomenclature, position, and sequence of the British species of *Fumaria* would be as follows:—

Series 1.—Fumariæ capreolatæ.

F. capreolata L. *β flavescens* (= *F. pallidiflora* Jord.).
F. muralis Sonder.
F. muralis Sonder, *β serotina* (= *F. confusa* Jord.).

Series 2.—Fumariæ agrariæ.

F. Gussonii Boiss. *γ Boræi* (= *F. Boræi* Jord.).

SERIES 3.—FUMARIÆ OFFICINALES.

F. officinalis L.
F. Vaillantii Lois.
F. parviflora Lamk.
F. micrantha Lag. (*F. densiflora* DC. p. p.?).

E. G. B.

Darwin and after Darwin. By the late G. J. ROMANES. Part iii. Post-Darwinian Questions. Isolation and Physiological Selection. 8vo, pp. viii, 181. London: Longmans, Green & Co. 1897.

THREE only of the six chapters of this, the concluding volume of Mr. Romanes' last work, were in type at the time of his death. These, the first two and the last, deal with Isolation. For the selection and arrangement of the other three chapters the editor, Prof. Lloyd Morgan, is responsible. Their subject is physiological selection—in the opinion of the author a very important form of isolation. There are also three appendices; the first embodies Mr. Gulick's criticism of Mr. Wallace's views on physiological selection; the second is entitled an examination by Mr. Fletcher Moulton of Mr. Wallace's calculation touching the possibility of physiological selection ever acting alone; the third is made up of some extracts from the author's note-books, and deals mainly with physiological selection and cross-infertility. The first two are inserted in accordance with the author's expressed injunctions. A portrait of the Rev. J. Gulick forms the frontispiece to the volume—a fitting compliment to a naturalist of whom the author says at the opening of the first chapter: "To his essays on the subject [of Isolation] I attribute a higher value than to any other work in the field of Darwinian thought since the date of Darwin's death." "Indeed I believe with Mr. Gulick that in the principle of Isolation we have a principle so fundamental and so universal, that even the great principle of Natural Selection lies less deep, and pervades a region of smaller extent." Along with Heredity and Variation, Isolation forms the tripod on which is reared the whole superstructure of organic evolution.

Isolation is defined as the prevention of intercrossing between a separated section of a species or kind and the rest of that species or kind. Such separation may be due to geographical barriers, to migration, or to any other circumstances leading to exclusive breeding within the separated group. It is a genus with two species, *Apogamy* and *Homogamy.* These were, Romanes thought, new words coined by himself to describe indiscriminate and discriminate isolation respectively. They are, however, well known to botanists under quite a different meaning. The difference between indiscriminate and discriminate isolation was pointed out by Mr. Gulick, who used the terms separate and segregate breeding to express the two forms. Indiscriminate isolation occurs, for instance, when a shepherd divides a flock of sheep without regard to their characters; but if he places all the white sheep in one field, and all the black sheep in another field, he is isolating one section from the other discriminately.

The two most important forms of discriminate isolation are—first, Sexual Incompatibility, either partial or absolute, between different taxonomic groups, or Physiological Selection; and second, Natural Selection. The importance of indiscriminate selection depends on the fact, pointed out by Mr. Gulick, that no two portions of a species have exactly the same average character, and the initial differences by continually reacting upon each other, and on the environment, ensure increasing divergence as long as the individuals of the two groups are kept from intergenerating. That is to say, the originally indiscriminate selection becomes discriminate.

Chapters I. and II. are devoted to a discussion of Isolation as a general principle. In the third we pass on to consider Physiological Selection, or "that form of isolation which arises in consequence of mutual infertility between the members of any group of organisms and those of all other similarly isolated groups occupying simultaneously the same area." The author summarizes the main points of this theory, and in the next chapter puts forward several kinds of evidence in its favour. These include evidence from geographical distribution. The production of numerous species in large areas, and the richness in species of dominant genera within those areas, points on which Darwin insisted, are shown to be capable of explanation by the working of physiological selection. Evidence from topographical distribution (*i. e.* distribution with reference to comparatively small areas), both of species and varieties, and from the working of prepotency, is also adduced, and is of special interest to botanists.

The last chapter is an historical sketch entitled "A brief history of opinions on Isolation as a factor of organic evolution," and concludes with twelve "Articles," which declare that "Natural Selection has been the main, but not the exclusive means of modification," for "without isolation, or the prevention of intercrossing, organic evolution is in no case possible. Therefore it is Isolation which *has* been the exclusive means of modification," or, more correctly, the universal condition to it; and finally, "where common areas and polytypic evolution are concerned, the most general and most efficient form of isolation has been the physiological." The volume is an eminently suggestive one, especially for botanists, for plants afford the best material for the kind of work which must establish or refute the articles laid down by Mr. Romanes.

A. B. R.

Die Sumpf- und Wasserpflanzen. Ihre Beschreibung, Kultur und Verwendung. Von WILH. MÖNKEMEYER. 8vo, pp. iv, 189, with 126 figures in the text. Berlin: Schmidt. 1897.

THE object of the present volume is to meet the want of a book dealing with water- and damp-loving plants—a want which has arisen from the increased use of aquaria, and also of aquatic and marsh-plants in landscape-gardening. The author is "Inspector" of the Botanic Garden of Leipzig University, and is therefore presumably in a position to speak with authority on points of cultivation. His book consists of an account of the genera and best-known species which are either already in use or might with advantage be brought into use for horticultural purposes. The arrangement adopted is that of Engler & Prantl's *Pflanzenfamilien*, from which also some illustrations have been borrowed. Many of the figures, which are chiefly to give an idea of the habit of the plant, are new, and on the whole good, especially those of *Iris Pseudacorus* on p. 89, and the Orchises on p. 93. We are glad to note in the accounts of individual genera and species that reference is made to their geographical distribution and the nature of their habitat. It must add greatly to the interest of plant-cultivation to know a little about the native homes of one's specimens. Herr Mönkemeyer's book will doubtless prove a welcome addition to the library both of the amateur and professional horticulturist.

A. B. R.

ARTICLES IN JOURNALS.[*]

Annals of Botany (Dec.). — J. C. Arthur, 'Movements of Protoplasm in Coenytic Hyphæ.' — C. O. Townsend, 'Correlation of growth under influence of injuries.' — J. B. Farmer, 'Structure of a hybrid Fern' (*Polypodium Schneideri* (*aureum* × *vulgare* var. *elegantissimum*): 2 pl.).—J. Ll. Williams, 'Antherozoids of *Dictyota* and *Taonia*' (1 pl.).—J. R. Green, 'The supposed alcoholic enzyme in yeast.' — S. H. Vines, 'The proteolytic enzyme of *Nepenthes*.'— H. H. Dixon, 'Tensile strength of cell-walls.' — Id., 'Structure of *Codium*.'

Bot. Centralblatt (1897, No. 44).—E. H. L. Krause, 'Floristische Notizen.'—(No. 45). J. Erikson, *Ranunculus illyricus*.— (No. 46). J. Bornmüller, *Rhamnus Sagorskii* (= *R. orbiculata* Bornm. olim). — (No. 47). F. G. Kohl, 'Die Protoplasmaverbindungen d. Spaltöffnungsschliesszellen' (1 pl.). — (No. 48). A. J. Ewart, 'The relations of chloroplastid and cytoplasma.' — (Nos. 49, 50). J. Eriksson, 'Uebersicht d. Ergebnisse d. Getreiderostuntersuchung.' (No. 50). P. Knuth, 'Neue Beobachtungen über fledermausblütige Pflanzen.' — (1898, Nos. 1, 2). G. Amadei, 'Ueber Eiweisskörper in der Familie der Balsamineen.' — (No. 3). H. Eggers, 'Plantæ novæ Ecuadorienses' (*Poulsenia*, n. g. (Artocarpeæ)). — (Nos. 3, 4). A. Weberbauer, 'Beiträge zur Anatomie der Kapselfrüchte.'— (No. 4). F. C. Newcombe, 'Cellulose-Enzyme.'

Bot. Gazette (17 Nov.).—A. P. Anderson, 'Normal and diseased organs of *Abies balsamea*' (2 pl.). — W. Fawcett, 'Public gardens and plantations of Jamaica.' — G. J. Pierce, 'Variation in leaf arrangement in a Maple.' — (23 Dec.). J. Donnell Smith, 'Undescribed plants from Central America.'—E. B. Copeland, 'Relation of nutrient salts to turgor.' — W. W. Rowlee & K. M. Wiegand, Plants collected in North-west Greenland, 1896. — G. H. Shull, 'Disguises in bud arrangement.'—A. H. Curtiss, 'Notes on Florida plants.'

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[*] The dates assigned to the numbers are those which appear on their covers or title-pages, but it must not always be inferred that this is the actual date of publication.

Bot. Notiser (häft 6: 15 Dec.). — S. Murbeck, 'Om vegetativ embryobildning hos flertalet Alchemillor.' — R. Tolf, 'Förteckning öfver parasitsvampar, iakttagne i trakten kring Jönköping.'

Bot. Zeitung (16 Dec.).—H. Solms-Laubach, 'Ueber die in den Kalksteinen des Culm von Glätzisch Falkenberg in Schlesien enthaltenen Structur bietenden Pflanzenreste.' — (16 Jan.). A. Scholer, 'Das Verhalten der Nebenwurzeln in der verticalen Lage.'

Bull. de l'Herb. Boissier (Oct.). — J. Freyn, 'Ueber neue und bemerkenswerthe orientalische Pflanzenarten.' — A. Chabert, 'Villars sous la Terreur.' — N. Barbey, *Bryum Haistii.* — H. Schinz, 'Kenntnis der Moosflora der Hawaiinseln.' — Id., 'Kenntnis der Afrikanischen Flora.'—(Oct., Nov., Dec.). H. Hallier, 'Bausteine zu einer Monographie der Convolvulaceen' (7 pl.). — (Nov.). H. de Boissieu, 'Les Ericacées du Japon.' — R. Chodat, *Stapfia* (n. g. Palmellaceæ: 1 pl.). — Id. & A. Lendner, 'Le diagramme des Crucifères.'—Id. & M. Goldfuss, 'Culture des Cyanophycées' (1 pl.). —A. Preda, 'Sac embryonnaire de quelques Narcissées.' — Id., 'Algues marines de Livourne' (map).—J. Briquet, *Sphacele Urbani*, sp. n. — R. Buser, *Anacamptis pyramidalis.* — (Dec.). E. Huth, 'Ranunculaceæ Japonicæ.'

Bull. Soc. Bot. France (Nov.: xliv., no. 7).—A. Chatin, *Terfezia Aphroditis*, sp. n. (1 pl.).—D. Clos, 'Les *Anagallis* annuels d'Europe.' — X. Gillot & P. Parmentier, '*Lamium album*, cas tératologique' (1 pl.).—Id., '*Rumex palustris*.' — A. Franchet, *Botrychium simplex*. —A. Battandier, 'Contribution à la Flore Atlantique.'— E. Perrot, 'Anatomie des Menyanthées' (1 pl.).—A. Chabert, 'De Tunis à Tyout.'—P. Candargy, 'Flore de l'île de Lesbos.'

Bull. Torrey Bot. Club (30 Dec.). — E. G. Britton, Revision of N. American Ophioglossums (2 pl.). — T. H. Kearney, 'Plants of Eastern Tennessee.'—A. Hollick, 'Affinities of *Caulinites*' (1 pl.).

Erythea (24 Nov.). — K. Brandegee, 'Notes on Cacteæ.'— (26 Dec.). C. Purdy, *Iris Watsoniana*, sp. n. — (3 Jan.). J. B. Davy, 'Flora of Honey Lake Valley.'

Gardeners' Chronicle (27 Nov.). — *Selaginella Crugeri* Jenm., sp. n.—(27 Nov., 4 Dec.). O. Stapf, 'Botanical history of Pampas Grass and allies' (*Cortaderia*, gen. nov.). — (4 Dec.). *Passiflora pruinosa* Mast., *Miltonia Binoti* Cogn., *Dendrobium barbatum* Cogn., spp. nn.—(11 Dec.). *Ipomœa Perringiana* Daumer, *Cochlioda stricta* Cogn., spp. nn. — (18 Dec.). *Marattia Burkei* Baker, sp. n. (fig. 129).—(8 Jan.). *Cypripedium Crawshawiæ* O'Brien, sp. n.

Journal de Botanique (1 Oct.).—C. Sauvageau, 'Algues du Golfe de Gascogne.'—A. De Coincy, '*Teucrium saxatile* Lam.'—(16 Oct.). P. Van Tieghem, 'Une nouvelle sorte de Basigamie.'—(1, 16 Nov., 1 Dec.). N. Patouillard, 'Flore mycologique de Tonkin.'—(1 Nov.).

X. Gillot, '*Chelidonium majus* var. *laciniatum*.' — (16 Nov.). J. Baagoë, '*Potamogeton undulatus* Wolfg. (*P. crispus* × *prælongus*)' (1 pl.). — (1 Dec.). E. Perrot, 'Sur le tissu conducteur surnuméraire.' — (1 Jan.). A. De Coincy, 'Plantes nouvelles de la Flore d'Espagne.' — M. Mirande, 'Malate et malophosphate de calcium dans les végétaux.'— —. Hue, 'Les *Ramalina* à Richardmesnil.'

Journ. Linn. Soc. (2 Dec.). — Sir John Lubbock, 'On Buds and Stipules' (concl.: 4 pl.).

Oesterr. Bot. Zeitschrift (Jan.). — K. Fritsch, 'Zur Systematik der Gattung *Sorbus*.' — R. v. Wettstein, 'Die Innovations-Verhältnisse von *Phaseolus coccineus*' (concl.).—E. Hackel, *Poa Grimburgi*, sp. n. — F. Bubák, *Puccinia Scirpi*. — J. Rick, 'Zur Pilzkunde Vorarlbergs.' — C. Baenitz, 'Ueber seltene und neue Rubi und Rubus-Hybriden.'

Trans. Linn. Soc. (Oct.). — D. T. Gwynne-Vaughan, 'Some points in the morphology and anatomy of *Nymphæaceæ*' (2 pl.).— (Dec.). W. C. Worsdell, On 'Transfusion-Tissue' (4 pl.).

BOOK-NOTES, NEWS, &c.

Our transatlantic friends have so accustomed us to well-printed and cheap books, often on good paper, that part i. of Mr. C. R. Orcutt's *Review of the Cactaceæ* comes upon us as a surprise. It is execrably printed in double columns on wretched paper, abounds in misprints, has no title-page, and contains exactly thirty pages of text—plus a prefatory note embodying certain corrections—and costs a dollar! There is no clavis, and the species are arranged alphabetically, and numbered, the varieties (many of which are mere names, without description or reference) receiving a separate number. Several species are described. We have seldom seen a more unprepossessing publication.

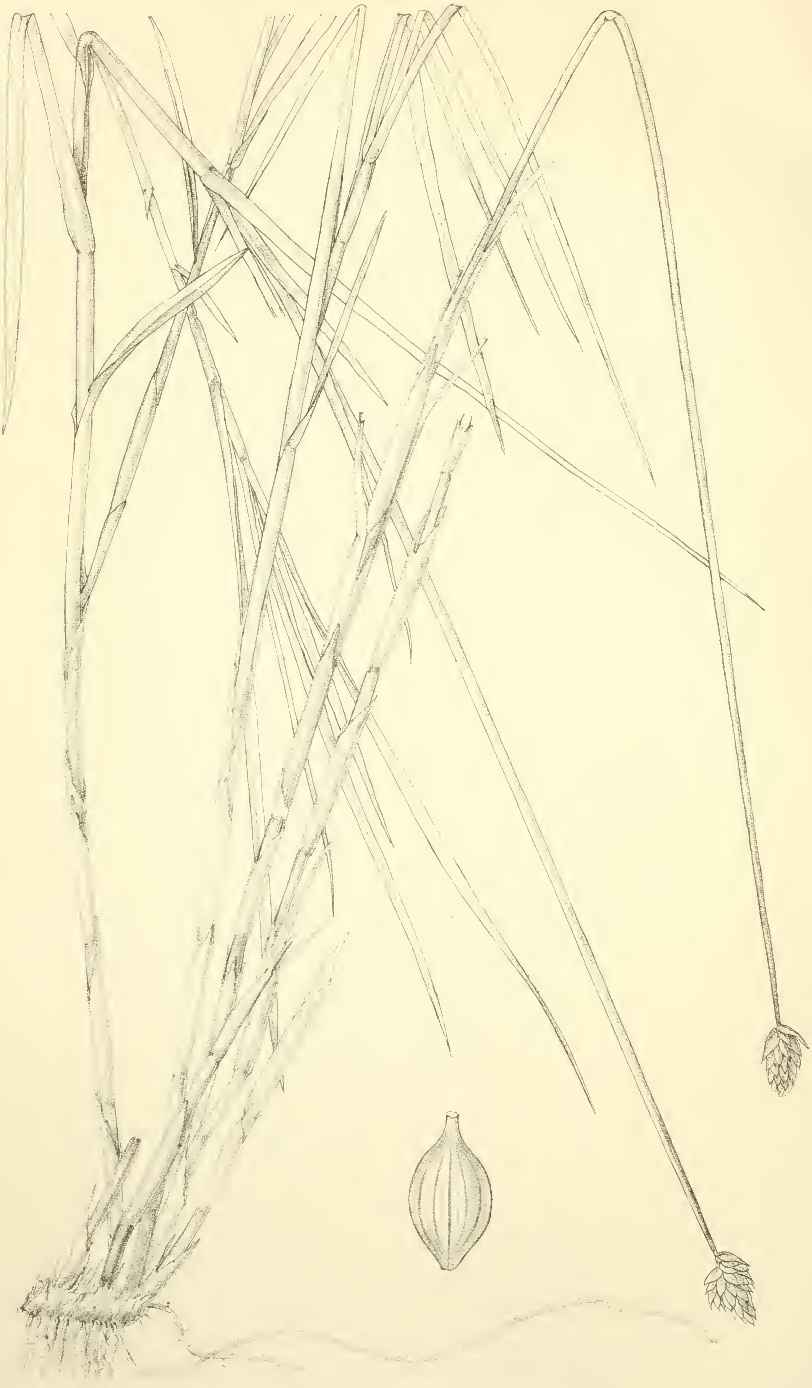
Messrs. Underwood & Earle's *Preliminary List of Alabama Fungi*, issued by the Alabama Agricultural Experiment Station (April, 1897), is based on the Berkeley & Curtis's "Notices of North American Fungi," on species collected by Judge Peters in Alabama, which were incorporated in the Ravenel exsiccati, and on the results obtained by recent workers in that field, chiefly by the authors of the list. It does not lay claim to completeness, and can hardly even be considered representative, so meagre are the records for some widely-distributed forms, as, for instance, the *Mucorini*, of which but two species have been found as yet. The authors state that they have followed largely the classification adopted by Schröter in Engler & Prantl's *Pflanzenfamilien*. They have followed his nomenclature also in substituting for the familiar *Cystopus* the older name *Albugo*. Under *Polyporus* they have grouped—and who can blame them?—all the species distributed by Saccardo and others under *Fomes*, *Polyporus*, *Polystictus*, *Poria*, and *Favolus*, and the species have been arranged under the different genera in alphabetical order. Such a method is no doubt convenient, but it is fatal to the sense of relationship or of sequence. The appendix contains useful and practical suggestions as to the best methods of collecting and preserving the larger fleshy fungi, and a synopsis of the genera and subgenera of the *Agaricaceæ*. We may call their attention to Mr. Arthur Lister's admirable method of making and retaining spore-impressions, as described by him in this Journal for 1877, p. 369.—A. L. S.

We note with pleasure that Dr. George King, of the Calcutta Gardens, has received the decoration of Knight Commander of the Indian Empire.

The first part has been issued of *Icones Bogorienses*, a new publication from the Buitenzorg Garden, under the editorship of Dr. Boerlage. It will appear at uncertain intervals, and each number will contain twenty-five plates of new or little-known species, with accompanying letterpress. The present instalment, which is mainly occupied with *Polypetalæ*, contains plates and descriptions of *Indovethia*, a new genus of *Violaceæ*, and of *Gymnatocarpus*, a genus founded on *Artocarpus venosa* Zoll.

We are glad to learn that the new and greatly-enlarged edition of the well-known *Cybele Hibernica* of Moore & More is now in the press, and will be published in a few months. The preparation of this second edition, which is founded on the papers of the late Alexander Goodman More, joint author with the late Dr. David Moore of the first edition, published in 1866, has engaged the editors for upwards of two years. We are informed that the work will present many new features, and embody the latest results of botanical exploration in Ireland. The editors are Nathaniel Colgan, M.R.I.A., and Reginald W. Scully, F.L.S., friends of the late A. G. More and contributors to this Journal. A full prospectus is to be issued shortly.

The Messrs. Linton have issued the final fascicle of their Set of British Willows, which contains thirty-seven (instead of the stipulated twenty-five) numbers, bringing the total up to 112. In the note accompanying the specimens, the authors say:—"In the course of the last few years we have made some experiments in the cross-fertilization of Willows, and some of the most interesting results have been introduced into this fascicle. No. 88, *S. Caprea* × *lanata*, No. 92, *S. cinerea* × *Myrsinites*, and Nos. 99 and 100, *S. lanata* × *repens*, are examples selected which might occur in nature; and these products of design may at any time become useful for comparison. No. 98, *S. repens* × *viminalis*, was made in this way, at a time when the hybrid was not known for Britain; it has recently been detected by the Rev. E. S. Marshall in Sutherland. Besides these, Nos. 83 and 103, of which we could not procure satisfactory wild material, are supplied from plants which occurred spontaneously in the garden."



R Morgan del. et lith.

West, Newman imp.

Carex chordorrhiza *Ehrhart.*

NOTES ON SOME BRITISH SEDGES.

By the Rev. E. S. Marshall, M.A., F.L.S.

(Plate 383.)

The Editor has asked me to write an account of *Carex chordorrhiza,* lately found by Mr. Shoolbred and myself in the north of Scotland, and has assented to my adding remarks on some other native species. A short time ago, at Pfarrer G. Kükenthal's invitation, I sent him a large number of sheets from my collection; his comments upon these, which I have tested and supplemented as far as lay in my power by consulting books of reference and by examining the rich material at Kew and at South Kensington, appear to me so important and so accurate as to deserve wider circulation. My best thanks are hereby given to Messrs. Britten, J. G. and E. G. Baker, C. B. Clarke, and W. P. Hiern for their valuable help in directing me to various works and specimens; but they should not in any way be held responsible for the views adopted, except where this is expressly stated.

Carex chordorrhiza L. (ex Ehrhart). *C. funiformis* Clairvaux (*teste* Koch, *Synopsis*, ed. 2, p. 864). *Root* (or rather, underground stem) far-creeping, stoloniferous, wiry, sulcate, about the thickness of coarse twine, sending up at intervals obliquely ascending leafy branches and flowering stems, which are few-leaved or even leafless, smooth, straight or somewhat curved, about 6–12 in. high. *Leaves* glabrous, smooth, striate, flat, bright green, about 1–1$\frac{1}{2}$ line broad, mostly stiff and erect (rush-like), numerous on the barren shoots, falling considerably short of the inflorescence. *Spikelets* male above, crowded together in a compact ovate (or, in fruit, occasionally triangular) head about $\frac{1}{4}$–$\frac{2}{5}$ in. long. *Glumes* light yellowish brown, somewhat darker in the centre, with a hyaline white border, obtuse or subacute. *Stigmas* 2. *Perigynium* ovate, turgid, convex, shining, glabrous, yellowish with conspicuous brown ribs, rather truncate below, gradually narrowed into a smooth, obtusely bifid beak, which is broadly scarious at the tip and has more or less jagged inner edges. *Nut* oblong-lanceolate, abruptly truncate above (so as to form a decided "shoulder"), pale yellow, dotted, with a slender beak almost equalling its length and usually projecting a little beyond the beak of the perigynium.

This description is mainly taken from British dried material; but I have also drawn upon other sources, as our specimens were in ripe fruit. Mr. Morgan's capital illustration does not show the remarkable root-character, for which there was no room on the plate, nor the curious beak of the fruit. The species is beautifully figured in *Flora Danica*, fasc. xiv. tab. 1408.

This well-marked plant grows in very wet peat-bogs, half-buried among *Sphagnum*, in just such places as produce *C. limosa*, with which it is associated at Altnaharra. It is found, according to Nyman, from Iceland, through Lapland and Finland, to N. Russia, thence southward and westward from Central Russia through the Salzkammergut, Switzerland, and S.E. France to Spain; being, therefore, not unlikely to occur in almost any part of the British Isles where suitable conditions prevail. It is easily overlooked, and should be detected elsewhere in this country, if searched for. There are specimens in the British Museum or at Kew from Iceland, Lapland, Finmark, N.W. Russia, N.E. and N.W. Germany, Sweden, Norway, Denmark, Tirol, Salzburg, Bavaria, and France; also from four stations in New York State, U.S.A. I find no obvious differences between them.

The species was first published (1780) in *Phytophylacium Ehrhartianum*, a scarce work containing dried plants, accompanied by short notes, in the following terms:—

"77. *Chordorrhiza.*
Carex Chordorrhiza L. Upsaliæ."

This, in the opinion of Messrs. Britten and Hiern, must stand as the true name; the affixed specimen is quite characteristic. Ehrhart, in the preface (dated October, 1779), dedicated his book "Cineribus Caroli a Linné"; the natural inference being that the elder Linné had seen the sedge in question and given it that name.

The second notice dates from 1781, in the *Suppl. Pl.* (Linn. fil.), p. 414:—"*Chordorrhiza: Carex* spica composita: spiculis androgynis approximatis superne masculis, capsulis compressis, radice repente filiformi. *Chordorrhiza. Ehrh. phytoph.* n. 77. *Habitat* in Suecia. *Ehrhart.*" On one or two of the older botanists' labels I see that it is actually called "*C. chordorrhiza*, L."; and there seems to be no good reason for crediting Ehrhart with a name which he never claimed to have originated.

C. MURICATA L. var. PSEUDO-DIVULSA Syme. A sheet of this plant from Hurtmoor, near Godalming, Surrey, not far distant from Frith Hill, the station for examples in Herb. Boswell-Syme collected by Mr. Beeby, and agreeing exactly with them, was sent to Herr Kükenthal with the enquiry whether they were true var. *virens* Koch. His reply was: "*Carex Leersii* F. Schultz (*C. virens* Koch est inextricabilis!)." On looking up a type-specimen in Herb. Brit. Mus., I found the identification to be quite correct; this was issued in F. Schultz and Winter's *Herbarium Normale*, Phanerogamia Cent. 2, no. 173, labelled: "*Carex Leersii*, F. Schultz. Lieux pierreux sur les bords des vignes des côtes du muschelkalk et du calcaire tertiaire près de Weissenburg en Alsace. Déc. et rec. F. Schultz. fl. 6 mai 1871, fr. 3 juin 1869. *C. muricata* Hoppe Car. Germ. et, pro parte, *C. muricata* Lin. sp. 1382; *C. canescens* Leers herb., t. 14, f. 3."

I append a translation from the original notice in *Flora* for 1870, vol. liii. pp. 455, 459:—

"Under *C. muricata* L., *C. virens* Lam. and *C. divulsa* Good. were described as var. β. and γ. But, as F. Schultz has shown, various species were confounded under *C. muricata*, viz. *C. contigua* Hoppe (*C. muricata* Koch et auct.), *C. muricata* L. (Hoppe, *C. Leersii* F. Schultz, *C. virens* auct. nonnul. non Lam.), *C. Pairæi*

F. Schultz (*C. loliacea* Schk., non L.), *C. divulsa* Good. (and forma *C. guestphalica* F. Sch., Bönning. as a species), and *C. Duriæi* F. Sch. (*C. virens* auct. nonnul., *C. divulsa β virens* Durieu). What *C. virens* Lam. was cannot be ascertained, and the existing specimen derived from Lamarck is in such bad condition that nothing can be seen in it to afford any means of deciding" (p. 455).

"The *C. muricata* Hoppe (non Koch, nec auctorum), i. e. *C. canescens* Leers (non Lin.), which grows near Weissenburg and near Neustadt, sometimes together with the everywhere common *C. contigua* Hoppe (*C. muricata* Koch et auctorum), and which is so different from it that a non-botanist who helped me to collect it never once confused them, I have named *C. Leersii*, because I am now convinced that Linné understood both under the name *C. muricata*. According to the researches and drawings of my friend M. Paira, as well as my own observations, it differs from *C. contigua* Hoppe *inter alia* by the glume, which is much broader than long (in *C. contigua* it is much longer than broad), by the lowest bract, which is linear-lanceolate (in *contigua* it is ovate), by the shorter, broadly ovate perigynia, narrowed into a short beak (in *C. contigua* they are longer, and narrowed into a longer beak), and by the nut being sessile on the base of the perigynium (in *C. contigua* it is placed far above the base).

"I have found *C. Leersii* in various places on the slopes of the Haardtgebirge towards the Rhine valley, *e.g.* in great abundance in woods on the Rothliegende and on the borders of the Vosges near Neustadt, on the borders of vineyards near Weissenburg.

"The closeness or remoteness of the spikelets affords no constant character; for I have found *C. contigua* on Madeburg, in the Palatinate, with spikelets quite as distant as in *C. Leersii* and *C. divulsa*. I have called these *C. contigua* var. *remota*" (p. 459).

I find the above distinctions to hold good in the var. *pseudo-divulsa* of Surrey and Kent. This has the glumes mostly about half the length of the fruit, *taken together with its beak*, i. e. falling considerably short of the fruit alone; in our "type-*muricata*" (= *C. contigua*) they are about as long as the fruit without its beak. In var. *pseudo-divulsa* the fruit is considerably smaller than in *C. contigua* Whether it should rank as a species or as a variety must remain for the present an open question, so far as I am concerned.

C. ECHINATA Murray, var. GRYPUS (Schkuhr). My gathering of this, from the Allt Giubhas, near Kingshouse, Argyleshire, was assented to by Mr. Arthur Bennett, and agrees well with the figure in Hoppe's *Caricologia Germanica*. The roots which I took home in 1888 changed, however, into normal *echinata* the following year; Dr. Buchanan White also informed me that he did not think much of the Perthshire *grypus*. "*Carex grypus* Schk. nil nisi forma alpina obscurius colorata subreducta Caricis echinatæ."—G. Kükenthal.

C. CURTA Good. var. ALPICOLA Wahlenberg. I sent Herr Kükenthal sheets of the plant which we have been so calling in Britain from the moorland between the Little Culrannoch and Glen Canness and from the Driesh, Clova, Forfarshire, as well as from the base of the Sow of Athole, Perthshire. These are good examples of our alpine form, with which I am quite familiar. He replied: "Hæc est *C. canescens* var. *robustior* Blytt.—*C. alpicola* Wahl. = *C. Persoonii* Lang multo gracilior, spiculis magis approximatis, minoribus subrotundis, foliis angustioribus diversa." On comparison with Blytt's specimens in Fries's Herb. Normale at Kew and South Kensington, labelled "*C. canescens*, var. *robusta*," I find them to correspond exactly with the so-called *alpicola* of Britain; they come from "Norvegia *Voss in alpe Graasiden*, supra limitem Betulæ."

O. Boeckeler (*Die Cyperaceen des Königlichen Herbariums zu Berlin*) gives as synonyms of *C. alpicola* Wahlenberg, *Flora Lapponica*, 232, *C. Gebhardii* Hoppe, non Schkuhr (Schkuhr's plant appears to be *C. elongata* L., in part at least), *C. Persoonii* Sieber ("v. e."), *C. vitilis* Fr. and *C. macilenta* Fr., &c. Nyman keeps *C. macilenta* as a distinct species, and places *C. vitilis* under *C. Persoonii* as a subspecies. There is an authentic specimen of *C. Persoonii* in Herb. Gay at Kew, marked "Sieber misit, 1821". Sieber says on the label: "*curta. β. brunnescens* Persoon in alpibus tyrolensibus ad M. Glokner; differt a *C. curta*." This agrees exactly with *C. Gebhardii* Hoppe, of which I have seen two authentic examples and the figure in *Caricologia Germanica*—an exceedingly good one. Fries identifies his *C. vitilis* with Wahlenberg's *alpicola* and with "*C. Gebhardi* nonnull. nec Schkuhr." The figure of *vitilis* in *Flora Danica* evidently represents *C. Persoonii;* but I am somewhat doubtful whether the specimens of Fries in his Herb. Normale are quite the same thing—both at Kew and Brit. Mus. the material is poor and scanty, and I incline to believe that the plant is somewhat uncharacteristic *C. Persoonii*. Whether or no *C. Persoonii* and *C. vitilis* are distinct, neither of them seems to have yet occurred in this country.

C. OVALIS Good. var. BRACTEATA Syme. I have specimens under this name from Castle Moreton Common, Worcestershire, collected by Mr. Hanbury, and Cutt Mill Common, Puttenham, Surrey, gathered by me. "We should call these var. *capitata* Sonder."—G. K. The presence or absence of a foliaceous bract is apparently a character of no value in this species; a specimen found near Tain (last August) by Mr. Shoolbred and myself has one spike bracteate, the other not.

C. RIGIDA Good. var. INFERALPINA Laestadius. Herr Kükenthal confirms plants so named from the Little Culrannoch (*legit* Hanbury) and from the great bog on Glas Maol above Canlochan Glen, Forfarshire; they are, I think, inseparable from the specimens in Fries, Herb. Normale. *C. limula* Fries, to which (I believe) Mr. Bennett has lately been disposed to assign these gatherings, is considered by the German student to be *C. rigida* × *vulgaris*, and he has so named a sedge gathered by me on the high ground between Clova and Loch Lee; but it does not appear whether he has seen a type-specimen of *C. limula*. I cannot believe that those who are familiar with *C. rigida* in a living state will follow Prof. L. H. Bailey in combining it with *C. Goodenowii;* these frequently grow together, and the intermediates may prove to be hybrids between the two. Goodenough's types of *rigida* at Kew illustrate the normal plant admirably.

C. AQUATILIS Wahlenberg. Specimens from the moorland above Corrie Kander (Glen Callater), S. Aberdeen, are placed by Herr Kükenthal as var. *epigeios* Andersson; their glumes are very dark brown. The plant distributed by Dr. Buchanan White under this name from the White Myre of Methven, Perthshire, labelled "var. *C. epigeios* Laest. forma videtur sec. Almquist," he calls "*Carex vulgaris* Fr. γ *elatior* Lang, 2. *angustifolia* m."—it is clearly a form of *Goodenowii*, and not of *aquatilis*. My Aberdeenshire examples closely approach a Finmark plant of Th. M. Fries, labelled "var. *epigeios* Wahlb."

C. aquatilis × *rigida*. Four gatherings are so named:—(1) From the above-mentioned bog on Glas Maol; (2) from the wet moorland above the head of Glen Fiagh, Clova; (3) from near the Little Culrannoch (with some doubt; the specimens may be *rigida, inferalpina*); (4) from the Clach Leathad range, Kingshouse, Argyleshire. In the first three stations the supposed parents grow together abundantly; in the fourth I did not observe *C. aquatilis*, but the sheet is, as my correspondent remarks, "*C. aquatili* propior quam posteriori" [*rigidæ*]. They all seem to be partially, if not entirely, sterile. So far as I am aware, this hybrid was not previously recorded from Britain.

C. GOODENOWII J. Gay. I received through the Botanical Exchange Club plants collected by Mr. J. E. Griffith near Holyhead in 1889, labelled "*C. elytroides* Fries. See J. of B. 4/89." Herr Kükenthal remarks:—"*Carex elytroides* Fr. ex orig. longe aliena, nempe hybrida *Carex gracilis* × *vulgaris*. Hæc est nil nisi forma elatior *C. vulgaris*." I believe that this opinion applies equally to a similar plant of Mr. Griffith's from Maelog Lake, Anglesey, 6/93, sent under the same title. British botanists call *C. gracilis* "*C. acuta* L.," following Fries, &c.

C. Goodenowii × *rigida*. I forwarded a sheet from the Allt Giubhas, near Kingshouse, Argyle (c. 2000 ft.), suggesting this name, and received the following note upon it:—"Very probably *Carex rigida* × *vulgaris*. The strong red-brown rhizome, the broader leaves, with involute margins, and the black spikelets point to *C. rigida*, while the laxer habit speaks for *C. vulgaris*." I have very little doubt of this identification being right; the influence of *rigida* is unquestionable, but it is hardly pure *rigida*.

C. PANICEA L. var. INTERMEDIA (Miégeville). There are specimens at Kew of Bordère's gathering from near Gavarnie, Hautes-Pyrénées, at 1450 metres, collected in 1870 and 1875, and named as *C. intermedia* Miégeville, which exactly match my Fort William plant. "Hæc forma pulchra reducta Caricis paniceæ."—G. K. He remarks that K. Richter refers *C. intermedia* to *vulgaris* Fries, as does Nyman; but this appears to be an error.

C. pelia O. F. Lang. On an Altnaharra sheet of mine, so named by Mr. Bennett in 1887 (though I believe that he has since altered his opinion) and endorsed by Mr. Beeby, Herr Kükenthal writes:—"*Carex pelia* is a hybrid between *C. livida* and *C. panicea.* I possess original specimens, which differ widely from the present plant. This decidedly belongs to *C. panicea* L.; it is true that the fruit shows a certain amount of resemblance to *C. livida.*" Prof. Babington had written to me, in 1888: "I think your plant is far too near *panicea.*" The *Flora Danica* plate of *C. pelia* suggests a hybrid origin; but the only Scandinavian specimen that I have yet seen, labelled "*C. pelia—panicea* var. prope Christiania, 1852 in palude, J. Andersson," looks fertile, and is not very far removed, I think, from the Sutherlandshire form. *C. livida* should certainly occur in the north or north-east of Scotland.

C. FRIGIDA Syme (non Allioni). "Possibly a distinct species, between *Carex frigida* and *Carex binervis*, of which latter it has the rhizome, leaves, and colour. It further differs from *C. frigida* by the large ♂ spikelet, and by the margins of the utricle not being toothed."—G. K. This is a valuable independent confirmation of the view taken by Rev. E. F. Linton (see Journ. Bot. 1898, pp. 41–44). My sheet is derived from Dr. Boswell's garden at Balmuto.

C. DISTANS L. A dwarf plant, parallel to *C. extensa* var. *pumila* Andersson, which occurred (the type being absent) on the coast of Inver Bay, near Tain, E. Ross, in 1891, is identified by Herr Kükenthal as var. *litoralis* Andersson.

C. FULVA Good. Whatever opinion may be held as to the proper name for the species which we have lately been so calling in this country, it is, I think, evident that 1714 and 1714b of the *London Catalogue*, ed. 9, really represent only one plant, *viz.* the *C. Hornschuchiana* of Hoppe. I sent the whole of my mounted specimens to Herr Kükenthal, who replied as follows:—"Goodenough's figure represents a *Carex flava* × *Hornschuchiana;* his description gives only a single station for *C. fulva.* This leads me to express the supposition that *C. fulva* Good. is, after all, not identical with *Carex Hornschuchiana*, frequent in England as well [as with us], but represents the hybrid *flava* × *Hornsch.* Possibly Goodenough combined *C. Hornsch.* with *C. distans*, a confusion which might easily take place." I have consulted Goodenough's original description in Trans. Linn. Soc. ii. (1794), pp. 177–8 and 210, tab. 20. Two specimens are there figured; the smaller (right-hand) one is *C. flava* × *Hornschuchiana* for certain, the larger being probably that hybrid, but open to some doubt. Goodenough quotes for his plant *Flora Danica*, tab. 1049 ("*C. distans*"), which Lange, in the *Nomenclator Floræ Danicæ*, refers to *Hornschuchiana;* if so, it is a very indifferent representation, the colouring being much too fulvous, as in *C. xanthocarpa* Degland. The very name "*fulva*" suggests *flava* × *Hornschuchiana*, and is by no means apt for the true species, which has *brown*, not tawny or reddish glumes. The following extract from Goodenough's paper decidedly supports that view:—"This plant is scarcely removed from *C. flava*. However, it differs from it in having the angles of the culm sharp and rough. The female spikes are remote, oblong and acute, not round; the lowermost is supported by a long footstalk, half of which nearly appears above the vagina. Besides, it has scarcely ever more than two female spikes. The lowermost bractea is erect, and not divaricated. The capsules are not divaricated, but patent, and are slightly divided at the summit. I regret that I have had no opportunity of cultivating it."

To my great disappointment, no authentic specimens of *fulva* are to be found in the Kew collection, though (oddly enough) a sheet of *C. flava* from Goodenough's herbarium contains two specimens of unmistakable *flava* × *Hornschuchiana*, which indeed would be well represented by his right-hand figure. However, plants labelled "*C. fulva* Good." by Fries!, Hoppe!, Traunsteiner!, Schultz!, Gay!, are, one and all, that hybrid. It seems to me that the balance of evidence is overwhelmingly in favour of our retaining *C. Hornschuchiana* Hoppe as the true specific name, and dropping *C. fulva* Good. altogether, as was done by Babington.

C. Hornschuchiana × *Oederi*. Herr Kükenthal agrees with me in referring to this hybrid two gatherings (the name "*Oederi*" being used in the sense indicated below): *viz.* (1) from the shore of Loch Tulla, Inveroran, Argyleshire, 1889; and (2) from a wet moor near Loch Ussie, above Conan, E. Ross. In the latter case the second parent was *C. Oederi* var. *elatior* Andersson.

C. FLAVA L. var. MINOR Townsend. If the view here taken respecting *C. Oederi* is correct, this descriptive name for our commonest English form can be retained, at least provisionally. I may as well say at once that the views regarding *C. flava* and its European allies propounded by Prof. Bailey, and quoted in Journ. Bot. 1889, pp. 331–4, appear to me somewhat unconvincing (and in one instance, hereafter alluded to, distinctly misleading).

C. OEDERI Retz. Oeder's original plant is figured in *Flora Danica*, tab. 371 (1770), and erroneously referred by him to *C. divisa* Hudson. Herr Kükenthal says that it "certainly belongs to *C. Oederi*" (*i. e.* sensu auctorum, non Bailey). A careful study of the plate has convinced me that he is right; the drawing is indeed somewhat crude, especially as regards the important fruit-characters, but the habit, size and arrangement of spikelets, &c., fit that far better than our *flava*, *minor*. The stations given also point the same way:—"Locus. Copiose in convallibus collium arenæ mobilis (Dunen) insulæ *Sylt* & Eyderstettensibus"—just the sort of locality which would produce *C. Oederi* of Koch, Syme, &c.

It is curious that this species should so persistently have been assigned by most writers (Fries, *Summa Veg. Scand.*, is an exception) to Ehrhart, whose mention of it, in *Beiträge zur Naturkunde* (1790), p. 83, is of the briefest:—"79. *Carex Oederi* Retz. *Hannoveræ.*" The reference is to a plant in *Decas 8* of some (probably published) collection, respecting which no information seems to be now accessible. This is no better than a *nomen nudum*, in the absence of plate, description, or accompanying voucher-specimen. But the matter is of no practical importance, Retz having given a diagnosis as early as 1779, in *Floræ Scandinaviæ Prodromus*, p. 179:—

"1035. *C. Oederi*, spicis subquaternis sessilibus capsulis globosis acutis. Fl. D. 371. P. ar." [Pascua arenosa].

"*Obs.* Synonyma ab Ill. Oedero allata minime huc pertinent. *Flavæ* proxima, tamen distincta; cæspitose crescit, omnia minora, spicula mascula etiam sessili. Spica infima quidem bracteam habet, sed parvam. Capsulæ minime recurvæ. Prope Holmiam solo glareoso legi." This can, I believe, only cover *C. Oederi*, auct. plurim., and does not tally with *C. flava* var. *minor* Townsend.

My impression is that most of the specimens labelled "*C. Oederi*" by the older botanists belong to this species; but I am not at present in a position to prove it. However, I believe that the majority of authors were right, and that Mr. Bailey is wrong. In any case, var. *cyperoides* Marsson cannot stand as a synonym for *C. Oederi* auct. In his *Flora von Neu-vorpommern, Rügen und Usedom*, Marsson arranges aggregate *C. flava* thus:—

"A. *genuina*. α *vulgaris* Döll.
β *lepidocarpa* (Tausch).
γ *Marssoni* (Auersw.).
"B. *Oederi* (Ehrh.).
α *elatior* (Anderss.).
β *vulgaris*.
γ *cyperoides* Marss."

Var. *cyperoides* is therefore only a portion, and that not even the normal form, of this major variety or subspecies, as he understands it.

Var. *elatior* Andersson. Herr Kükenthal refers to this (he is also responsible for the other varietal identifications) a specimen from West Morden, Dorset, sent me by Rev. R. P. Murray mixed with good *C. lepidocarpa* Tausch, as well as a gathering of mine (no. 763) from near Loch Ussie, E. Ross. Marsson characterizes it as "caule gracili stricto ½–1 pedali; foliis angustissimis canaliculato-involutis caule brevioribus vel eum æquantibus."

Var. *cyperoides* Marsson. Western shore of Lough Owel, Co. Westmeath, Ireland; a strong, very tufted plant with broad, flat, mostly somewhat curved leaves.

Var. *œdocarpa* Andersson. Glen Nevis, W. Inverness. This approaches *flava*, *minor*.

C. ROSTRATA Stokes. In 1895 Mr. Shoolbred and I found a very robust form of this species (my no. 1478, approaching Mr. Praeger's Irish *C. rhynchophysa*) plentifully about Cong, both in Galway and Mayo; and a few days later I gathered exactly the same thing near Lough Drin, Co. Westmeath (my no. 1426), in the company of Messrs. Linton and our lamented host, Mr. H. C. Levinge. The second plant was referred by Mr. Bennett to *C. ampullacea*, forma *planifolia* Norman, Fl. Arct. Norvegiæ. "An older name for this variety is var. *latifolia* Aschers."—G. K. It seems to me worthy of varietal distinction.

A narrow-leaved, peculiar plant, which is plentiful among *Sphagnum* in Wybunbury Bog, Cheshire, and was sent by me to the Bot. Exch. Club in 1895, queried as *C. involuta* Bab., Herr Kükenthal and Mr. Bennett agree in considering as only a form of *C. rostrata*.

C. rostrata × vesicaria. Two of my plants, both totally sterile, are referred to this; the first was collected in Glen Callater, S. Aberdeen, in 1886; the second (my no. 95) in a bog on Meall Ghaordie, Perthshire, at 2800 ft., in 1891; it was then referred to *C. rostrata* var. *brunnescens* Andersson by Mr. Bennett. I incline to believe that they are the suggested hybrid. Has not *C. involuta* Bab. the same origin, as Herr Kükenthal surmises?

C. VESICARIA L. Herr Kükenthal places *C. Grahami* Boott, of which I was able to lay before him both well-matured wild specimens from Glen Fiagh, collected in 1893 by Mr. W. B. Boyd, and younger cultivated examples from Kew Gardens (1892), as a variety of *C. vesicaria*, rather than of *C. pulla* Good. This confirms my own previous opinion, based upon observation of the living plant at Kew. He endorses my naming of a sedge from Meall Ghaordie (1891), and also determines a tall-growing sedge from the large bog on the east side of Ben More, Perthshire (1889), at 2700 ft. (my no. 492), as *Grahami;* these are somewhat immature, but agree quite closely with the Kew specimens already mentioned.

Var. ALPIGENA Fries. Two gatherings, of 1888 and 1889 (the latter being my no. 493), from the large bog on the east side of Ben More, below Am Binnein, are so named, as well as a sheet from the Glen Lyon side of Meall-nan-Tarmachan, Perthshire, collected in 1891. These are practically identical with Swedish plants received from Herr Kükenthal, collected in a muddy marsh at Storlien, Jemtland (alt. 600 metres), last year by Emil Warodell, though not so well advanced in fruit.

I have carefully examined the authentic specimens of Fries, Herb. Normale, xviii. 71, in our two national herbaria, which do not agree well together. They are labelled "Jemtland, *Syltoppen*, &c. Leg. *C. F. Backman*. Exstat forma *C. vesicariæ C. rotundatæ* prorsus respondens et sub *C. pulla* confunduntur specimina tam e stirpe *C. vesicariæ* quam *C. ampullaceæ*." The British Museum plant looks to me like a tall-growing *pulla*, but is not very well developed. At Kew, however, the material is far more satisfactory; there are two plants, the left-hand one (almost exactly agreeing with my no. 493) having heads of rather a light brown, with the fruit not very strongly ribbed; in the right-hand one they are dark (blackish) brown with strongly ribbed perigynia; both are about 15 in. high, the glumes having a broad hyaline tip. They show an evident approach towards *Grahami*, and should, I think, be classed under *C. vesicaria* rather than under *C. pulla*, although forming one of the connecting links between the two.

One specimen on the Glen Lyon sheet just mentioned is extremely near to Fries, Herb. Normale plants, collected by Andersson and labelled "*saxatilis* (*dichroa*) typica, spicis haud infuscatis i. e.

pulla Good. Cave ne huc referas *C. vesicariam alpigenam*." However, in the *vesicaria*-bundle at Kew there is another sheet of *dichroa*, issued in Andersson's *Flora Lapponiæ Exsiccata* (1865), on which is written: "272. *Carex* (*vesicaria*) *dichroa*. Lapp. Lul. [here follows a word which I could not decipher]. 1862. And." There are three culms present, which have the fruit distinctly ribbed; they look intermediate between *Grahami* and *alpigena*, having a moderately long beak and slightly scarious-tipped glumes. On this evidence, I doubt whether *dichroa* can really be separated from *alpigena*. It may be added that typical *C. pulla*, brought from Ben Lawers in 1887, was grown in my garden at Witley for two years, and did not alter appreciably.

In conclusion, I must apologize for the length to which this paper has run; it seemed best not to omit any material particulars which were at my disposal.

WATSON'S CLIMATIC ZONES.

By Symers M. Macvicar.

In *Journ. Bot.* 1894, p. 4, there is an article by Messrs. I. H. Burkill and J. C. Willis, entitled "Botanical Notes from North Cardiganshire," in which altitudes are given of several species, among these being *Pteris* with an average of 1270 ft. on the south side of the hill. The authors mention that the average limit of this plant on the south side of the Grampians, as given by Watson, is 1500 ft., and on this account come to the conclusion that the arctic zone is nearer sea-level in Mid Wales than it is in the Highlands of Scotland. This, I think, is an error against which Watson tells us to be especially on our guard.

Comparisons of altitudes of plants which ascend our hills for some distance are apt to lead to false inferences, unless the hills which are compared are of nearly equal height, and are under the same conditions; by this latter is meant principally whether the hills arise from a table-land or long slope; or are divided by glens to nearly sea-level, as is so frequently the case on the west coast; and the presence or absence of such conditions should always be stated.

The highest point in the district of North Cardiganshire is given at 2460 ft., and that of the East Highlands, as given in *Cyb. Brit.*, at 4295 ft.; and although it is mentioned that the higher the hills are, the higher is the limit of the species, I think that the altitude of 2460 ft. is so low that it comes under the conditions which Watson gives as leading to an erroneous estimate when compared with those of a hill about 4000 ft., when within a few degrees of latitude. The authors also give Baber's heights for the Peak District of Buxton (1750 ft.)—the Lake District (3206 ft.)—with the extreme limit of *Pteris* at 1650 ft. in the former, and 1800 ft. in the latter; also Watson's in the East Highlands at 1900 ft., and their own in North Cardiganshire at 1500 ft. On this they remark: "We find that the Plinlimmon region is in this respect similar to the High Peak region, but dissimilar to the Lake region and the East Highlands": but, if this were the case, the *Pteris* ought to mount higher in North Cardiganshire with its higher hills than in the Peak District. The reason it does not do so is that the hills do not rise from a table-land in the former as they do in the latter. The expectation that as *Pteris* grows to 1900 ft. in the East Highlands, they should "get it possibly at 2300 ft., or at any rate 2000 ft. in Mid Wales," is founded, I think, on the same misapprehension. Again, it is stated: "Using Baker's test of the fruticose Rubi (exclusive of *R. fissus*) to determine the top limit of the mid-agrarian zone, we find it to end about 750–850 ft. This is again lower than Watson's limit in the East Highlands." Watson gives the limit of *R. fruticosus* L. there at 250 or 300 yds. But in *Journ. Bot.* 1891, p. 48, there is an article by Mr. Baker on Rubi in Wales where one species is mentioned as occurring at 1000 ft. on the Llanberis side of Snowdon, and this does not appear to be even on the south side of the hill. This latter altitude, being taken from a higher hill, gives a fairer estimate of the climatic zone in Wales as compared with the East Highlands, and would seem in itself evidence that the hills given in North Cardiganshire are too low for this purpose, there not being three-quarters of a degree of difference of latitude between the two Welsh localities. If the authors' conclusions were followed out, it would entail different zones for every small hill or small group of hills, with the arctic zone to descend in proportion to the lowness of altitude of the hills, provided they have a few rocks and some exposure.

It may be here remarked that altitudes of plants on the Snowdon range are much required. On the warm Atlantic coast in the latitude of the Grampians, cultivation stops at about 400 ft., the fruticose Rubi at 500 ft., and *Pteris* with an average of 1250 ft. on the south side of the hills; but it would surely be a mistaken use of terms to say that the climatic zone is lower here than in the East Highland range of mountains, even allowing for the humidity of the west coast being more favourable for arctic plants than is the drier eastern side of the country. It is, I think, almost entirely a condition of the surface of the land, the hills alluded to on the west coast being only about 3000 ft. high, and devoid of table-land. This usually implies that one side at least of the hills will have steep rocks suitable for alpine plants down to a lower level than occurs in a table-land district such as the Grampians.

Although Watson characterizes his zones by the presence or absence of certain plants, they are in reality "zones of temperature," as they are named by Baker in his *Flora of the Lake District;* and I think that the term "ascending" is preferable to "climatic" as applied to them, because the hills of Britain are not of sufficient height to allow us to judge of the relation between plants and climate in the arctic zone, even limiting the relationship to the conditions as occur with us. The upper limit at which the majority of plants are found in this zone is more a matter of soil and exposure than of temperature. A large number will ascend as high as there are suitable rocks, that is, usually, where there are moist ledges; their limit being due to other conditions than that of temperature in this country. To say that "within certain limits they are influenced by the proximity of the summit of a mountain and prevented from approaching it" is misleading, unless it be taken to mean that there is no suitable ground for plant-growth near the summit, except for a small number of species. This is seen on Ben Lawers, in Perthshire, where at 3600 ft. alt. on one side of the hill there are moist ledges of rocks with many plants; while at the same elevation on other parts of the hill there is the usual gravelly detritus of the tops, unsuitable except for very few species; and it is to be noticed that they are the species which also reach the summit, and are mostly plants with a considerable range of altitude, as *Silene acaulis*, *Saxifraga stellaris*, *Festuca ovina*, and *Lycopodium Selago*. The forty-six species given in *Cyb. Brit.* vol. iv. p. 323, which reach 3900 ft. and above, in the "upper limits of the Grampian Mountains," are almost all plants with a very considerable range of altitude, and which do not especially affect the summits. In fact, our rarest alpine plants are so often found grouped together at special spots, or in some particular corrie, that it would seem probable that their position is due to former geological conditions of a local nature rather than to general climate. The altitudinal distribution of plants in the southern part of Norway is the same in general as in this country; that is to say, most of the species which ascend our hills also ascend the hills in Norway, but they do this usually to a greater height in the latter, though in a higher latitude and with a lower average temperature. We see here that, *in comparison with our own*, the conditions of the surface, as higher hills in Norway with their greater surface-room for plants, affecting the altitudinal distribution more than climate does.

The so-called "trespasses" of plants from higher to lower altitudes at the side of waterfalls, which Watson considered to be due to a lower temperature caused by the cold spray of the water, is, I think, mainly the result of the site being favourable for plant-growth in general, being moist good holding ground; as it is in such places that the lower ground plants are found to reach their highest point, except in the case of a dry-soil plant as *Pteris;* and this would not be the case if the supposed coldness of such places affected them.

It is interesting to note, in connection with this subject, that at a meeting of the Scottish Meteorological Society, in July, 1896, a communication was made by Mr. R. T. Omond, of the Ben Nevis Observatory, in which it was stated that the rate of change of temperature for height on Ben Nevis, as on the Swiss hill stations, was found to be one degree Fahrenheit for 270 ft. Watson, judging from the observations known at his time, and from those made by himself, gave 1° F. for 300 ft.; but he mentioned that a difference of a tenth either way, 270 ft. to 330 ft., would be less than the variations at equal levels from local conditions. He inclined to the view that 330 ft. was more nearly correct, and considered that the Centigrade scale of half a degree for 300 ft., which would represent the slower rate of decrease, would give more correct results than that of Fahrenheit; but we now see that this would not be so.

ON THE RUBI AND ROSÆ OF THE CHANNEL ISLANDS,

By the Rev. W. Moyle Rogers, F.L.S., and F. A. Rogers.

At the end of last June we spent ten days in Guernsey and a week in Jersey. Unfortunately we were unable to visit Alderney; but we had a satisfactory day in Sark, under the guidance of Mr. Derrick, the President of the Botanical Section of the Guernsey Natural History Society. To him and to all the members of that Society, and especially to its Secretary, Mr. Royle, we are greatly indebted for advice and help; as we are also to Mr. Lester, of Jersey. Although we cannot of course flatter ourselves that we have nearly mastered the *Rubus* and *Rosa* flora of the three islands we visited, we venture to hope that this paper will contain a useful contribution towards our knowledge of it; and we hardly expect that further research will add very greatly to the number of the species now recorded.

As may be gathered from the notes which follow, the genus *Rosa* is very indifferently represented in the islands; but the Rubi are abundant and of considerable interest. Professor Babington's *Primitiæ Floræ Sarnicæ* was published in 1839, before he had given any special study to the latter genus. Consequently we find him crediting the islands with only four species, and it is probably quite impossible now to ascertain what plants he referred to under the names he gives. Two out of the four, viz. *R. villicaulis* and *R. Koehleri*, we searched for in vain; and his other two names, *R. rhamnifolius* and *R. fruticosus*, are confessedly used in an aggregate sense only. A few years ago, in a very hurried visit, the Rev. Augustin Ley was able to record two species of great interest from Jersey, *R. Questierii* and *R. Borœanus*. And so the *Rubus* list stood, so far as we could ascertain, at the time of our visit last summer.

We saw in all about thirty distinct forms, as named in the following notes, besides five or six obscure ones which may prove too strictly local to require naming. These last, with one exception in Guernsey and one in Sark, occurred in Jersey, where, as might be expected, the close alliance with British forms is less marked than it is in the more western islands. In all the islands, however, the vast majority of the brambles seen are practically identical with our British forms.

From Jersey we crossed to Brittany, and, after a few days at Dinan, made our way through Normandy to Dieppe and Boulogne. Our opportunities for studying the Rubi and Rosæ of N.W. France did not prove good; but we have been encouraged to believe that a very brief reference to the French species seen by us, in connection with the Channel Islands records, will not be thought out of place in this paper. No localities are given for France or for the islands but those in which we saw the plants in question growing; except in the case of two Sark rose localities of Mr. Derrick's furnishing, of which we saw dried specimens. As on so many previous occasions, we are greatly indebted to Dr. Focke for his ready and valuable help in our efforts to name some of the obscurer Rubi.

RUBI.

SUBERECTI.

Rubus affinis Wh. & N. var. *Briggsianus* Rogers. Guernsey: in several places, especially at St. Sampson's, Petit Bot Bay, and Cobo. Jersey: in one spot near the Waterworks Valley. Exactly the British form described in Journ. Bot. 1894, 42. The only suberect bramble seen by us in the islands.

RHAMNIFOLII.

R. incurvatus Bab. Jersey: St. Aubin's Bay. Not the typical plant, but a form with leaflets thinner, more roundish, and with paler felt beneath, which is found in some quantity in at least three S. England counties.

R. rhamnifolius Wh. & N. (sp. coll.). Guernsey: Fermain and Petit Bot Bays; very near the ordinary British form (*R. cardiophyllus* Lefv. & Muell.), if not identical with it. Jersey: Rozel and Pont Marquet; small-leaved forms. Normandy: Bonsecours Hill, near Rouen, in plenty; just the plant we are calling *R. cardiophyllus*, which (unlike the rare typical *R. rhamnifolius*) seems dispersed throughout Western Europe, and is one of our commonest and most constant forms.

R. pulcherrimus Neum. Guernsey: Rather common, especially about St. Peter Port, Petit Bot Bay, and near Vale Castle. Jersey: Trinity Hill; Waterworks Valley.

R. dumnoniensis Bab. Guernsey: Petit Bot Bay, in good quantity; and in one or two other localities. Sark: Near Dixcart Hotel, in plenty. Jersey: One of the most frequent brambles. Especially abundant at Gorey Bay, Val des Vaux, Waterworks Valley, and Pont Marquet. Usually identical with our luxuriant British form; but a second form occurs in Sark, and at Petit Bot Bay, Guernsey (unknown thus far in Britain), with terminal leaflet subrotund and strongly cordate.

R. rhombifolius Weihe. Guernsey: Fermain Bay.

R. argentatus P. J. Muell. Guernsey: One of the most abundant brambles in the island; generally distributed, but variable. Jersey: Fauvic; Waterworks Valley; Pont Marquet. Abundant in places, but apparently not so general as in Guernsey. Brittany: La Garaye, near Dinan. Normandy: Hill above La Bouillé.

Var. *robustus* (P. J. Muell.). Here, rather than under the type, appear to belong forms that occur at Cobo, near St. Martin's Church, Fermain Bay, and St. Sampson's, in Guernsey, and near Coutances, in Normandy; but the range of variation is considerable and somewhat bewildering. A very handsome plant occurring in good quantity in Waterworks Valley, Jersey, Dr. Focke thinks is his *R. macrostemon*, though it differs from the German plant in its more luxuriant and diffuse panicle. It seems to go off from *R. robustus* towards *R. danicus* Focke, while on the whole best placed perhaps in the *Discolores* group.

DISCOLORES.

R. rusticanus Merc. Very common in the islands and on the French coast opposite them, and at least as variable as in England.

SILVATICI.

R. macrophyllus Wh. & N. Jersey: Deep lane, Bouley Bay; a shade form. Brittany: La Garaye, near Dinan. Normandy: Moulineux, wood border.

Var. *macrophylloides* Genev. Guernsey, rather frequent: St. Sampson's; St. Martin's; Fermain Bay. Sark: Very fine and remarkably abundant, apparently more so than all the other brambles in the island put together. Dr. Focke considers this "very near *R. Schlechtendalii*." It seems best to regard it as a strong and highly glandular form of that variety. In England thus far found only in Monmouthshire and South Devon with certainty, though a rather similar form has been gathered in West Gloucestershire and Salop.

R. Questierii Lefv. & Muell. Jersey: Val des Vaux, the locality in which this species was discovered by the Rev. Augustin Ley several years ago. Elsewhere in the islands we searched for it in vain, though it is probably not confined to this one Jersey locality, as it seems remarkably abundant on the French coast. Brittany: La Garaye and near Lehon, in plenty. Normandy: Coutances and elsewhere; Moulineux, abundant.

R. Sprengelii Weihe. Guernsey: Fermain Bay. Jersey: Anne Port and Bouley Bay. Quite typical in both islands,

R. micans Gren. & Godr. Jersey: Gorey and Anne Port. Brittany: La Garaye, abundant. Normandy: Certainly one of the commonest brambles, and usually identical with Genevier's own specimens of his *adscitus* and our typical S.W. England form.

R. leucostachys Schleich. As an aggregate species abundant in Guernsey and Jersey, though usually in an untypical form. Seen also on Sark. Brittany: What seems a form of this at La Garaye. Normandy: Moulineux.

Var. *angustifolius* Rogers. Guernsey: Fermain Bay. Jersey: Pont Marquet; Anne Port; Rozel. Normandy: Moulineux. Nearly allied to *R. leucostachys*, and considered by Dr. Focke to be also "near *R. argyranthus* Boul. & Luc." are plants which occur in some quantity at Norgeots, Guernsey, and at Bouley Bay, Jersey; but these demand further study.

R. ADENANTHUS Boul. & Gillot. Dr. Focke has thus named a very handsome plant which grows in some quantity in Gorey Bay, Jersey. In general appearance it seems intermediate between *R. leucostachys* and *R. radula* Weihe, while also somewhat recalling

R. Gelertii K. Frid. and strong forms of *R. micans* Gren. & Godr. Nothing quite like it has yet been identified in Britain. It agrees well with M. Gillot's authentic French specimens lent by Mr. Gelert, of Copenhagen. Their label is as follows:—"Association rubologique, 1881. No. 429, *Rubus adenanthus* Boul. et Gill. Saône-et-Loire. Talus de la route d'Autun à St. Léger. Sous Beuvrai, en face du Nameau de Channay: sol granitique et sablonneux, alt. 800 m. 11 juillet, 1881. Coll. Gillot." The Gorey Bay locality is very sunny, and the soil, I believe, is granitic. The plant, as it grows there, may be thus described:—Stem bluntly angular and striate, of a dull purplish brown, rather thickly clothed with fine single and clustered hairs which nearly hide the numerous shortly stalked glands and few scattered pricklets. Prickles many, strong, subequal, patent or slightly declining, nearly confined to angles. Leaves 3–5-nate pedate, grey- or whitish-felted beneath, with compound incised toothing. Terminal leaflet obovate-acuminate, with rather narrow emarginate or subentire base. Panicle pyramidal-corymbose, with subracemose ultra-axillary top, short ascending cymose intermediate branches, and longer more strongly ascending racemose branches below; the rachis and pedicels with many slender falcate and declining prickles, and patent hairs hiding the acicles and stalked glands. Calyx with sunken glands, and attenuate points ascending after fall of petals. Stamens rather short, but exceeding styles. No fruit seen.

EGREGII.

R. Boræanus Genev. Guernsey: Lane above Glatney Esplanade, St. Peter Port; a form with very few pricklets on faces of stem, and an abnormally prickly panicle. St. Sampson's; a plant which also seems to go best under this species. Jersey: General; quite typical in some places, but variable in others. Fauvic, Les Marais, and Val des Vaux, in plenty; Waterworks Valley; Gorey; Anne Port. First reported from Jersey by Rev. Augustin Ley.

R. Borreri Bell-Salt. Guernsey: Abundant and characteristic near Vale Castle, in quarries between St. Sampson's and L'Ancresse Common, and at Ville au Roi. Jersey: Bouley Bay.

RADULÆ.

R. radula Weihe, var. *anglicanus* Rogers. Jersey: Waterworks Valley and Pont Marquet. In good quantity, and in all respects identical with the luxuriant form of this variety so common in the Bournemouth neighbourhood, in E. Dorset, and S.W. Hants. No other well-marked form of *R. radula* seen, though a plant found near Fauvic, in Jersey, looks as if it might be a weak state or form of this species.

R. rudis Wh. & N. Guernsey: Fermain Bay.

R. Bloxamii Lees. Guernsey: Widely distributed, and mostly quite characteristic. Petit Bot Bay; La Valette and elsewhere about St. Peter Port; St. Martin's; Norgeots.

Another handsome plant of this group, clearly allied to *R. longithyrsiger* Lees, but with a much broader and more developed panicle than is found in that species, occurs in considerable quantity on the north coast of Jersey, between the churches of St. Mary and St. Lawrence, as well as in Waterworks Valley and in St. Aubin's Bay. But this remains unnamed at present.

No members of the groups *Koehleriani* and *Bellardiani* were observed in the islands.

Cæsii.

R. dumetorum Wh. & N., *ferox* Weihe. Generally distributed, but variable, as in Britain. Brittany: La Garaye, with white petals, as usually in England. Normandy: Near Coutances, with pink petals, as in Germany; Lison.

Var. *diversifolius* (Lindl.). Sark: Banks near the Dixcart Hotel, a weak form.

Var. *tuberculatus* Bab. Jersey: Between Les Marais Railway Station and Fauvic, in some quantity.

R. corylifolius Sm. (sp. coll.). Guernsey: Cobo; near Vale Church. Sark. Jersey: Gorey; Anne Port; Grosnez.

a. *sublustris* (Lees). Jersey: Bouley Bay; the type.

b. *cyclophyllus* Lindeb. Guernsey: Fairly frequent. Jersey: Bouley Bay.

R. Balfourianus Blox. Sark: Very characteristic, though weaker than the average plant. Jersey: Head of the Val des Vaux; an exceedingly luxuriant form.

R. caesius L. Guernsey: Rather frequent. Jersey: Les Marais; Corbière. Not observed in great quantity. Normandy: Very general and variable.

R. laciniatus Willd. Guernsey: Petit Bot Bay; not quite the usual form.

The only hybrid Rubi seen in the Channel Islands, as to the origin of which there seemed little room for doubt, are the following:—*R. rhamnifolius* × *leucostachys*. Jersey: Rozel.—*R. rusticanus* × *tuberculatus*. Jersey: Les Marais.

A very brief notice of other Rubi observed in Britany or Normandy, though *not in the Channel Islands*, may be of interest here.

R. suberectus Anders. Brittany: In the valley of the R. Rance, near Dinan. A nearly unarmed but well-marked form of this species.

R. erythrinus Genev. Brittany: La Garaye and elsewhere in the Dinan neighbourhood; common. Clearly the same plant as the one we are naming *R. erythrinus* in England, though showing a tendency to a broader and so more nearly subrotund terminal leaflet. At La Garaye occurs in some quantity what seems to be *R. erythrinus* × *micans*, *R. micans* being abundant there also. The apparent absence of *R. erythrinus* from the Channel Islands is remarkable.

R. oigoclados Muell. & Lefv. Apparently a form of this. Brittany: Near Dinan. Normandy: Near Coutances.

R. Babingtonii Bell-Salt. Normandy: Border of Moulineux Forest. A weak form, thus named by Dr. Focke.

R. rosaceus Wh. & N. (sp. coll.). Brittany: Near Dinan; a form near the British var. *infecundus* Rogers.

R. Questierii × rusticanus. Normandy: Near Coutances.

Rosæ.

Rosa pimpinellifolia L. Guernsey: Grande Havre. Sark. Jersey: Frequent along the coast.

R. rubiginosa L. Guernsey: Perrelle Bay. Sark, *Mr. Derrick*! Jersey: Gorey. Perhaps doubtfully native.

R. micrantha Sm. Sark. Jersey: Pont Marquet.

R. canina L. Generally but thinly distributed in Guernsey and Jersey. No form seen but var. *dumalis* Bechst. Sark, *Mr. Derrick*! Brittany: Dinan neighbourhood; vars. *lutetiana* and *dumalis*, the latter in great quantity. Normandy: Var. *lutetiana*, La Bouillé; var. *dumalis*, generally distributed.

R. stylosa Desv. var. *systyla* (Bast.). Sark: Dixcart Bay, several fine bushes. Apparently not before recorded from the islands. Brittany: Near Dinan.

Other roses seen in Normandy are—

R. tomentosa Sm. var. *scabriuscula* (Sm.), or form near it. Moulineux.

R. obtusifolia Desv. La Bouillé.

R. arvensis Huds. Moulineux.

THE FIFTY YEARS' LIMIT IN NOMENCLATURE.

By the Editor.

In the last number of the *Botanisches Jahrbuch* (xxiv. heft 4, pp. 492–502 (8 Feb. 1898)) Prof. Engler has put into practice the rules for nomenclature to which he and his assistants last year subscribed their names.* We had hoped that, considering the manifest difficulties in interpreting at least one of these rules, they would not be adopted until some opportunity had been given for their discussion.

It is obvious that if Prof. Engler's example were generally followed, the confusion which at present prevails in botanical nomenclature would be increased to an indefinite extent. What our transatlantic friends call "the Rochester Code" was drawn up by a committee of seven botanists from various centres, and submitted to a more or less representative gathering of American botanists before their adoption and promulgation. The Berlin rules have not even received the adhesion of all the botanists of that city; they are put forward by Prof. Engler and his assistants on their sole authority. There is nothing to prevent any other botanical centre from promulgating a series of rules of its own; and if this were carried on to any considerable extent, the result may be imagined.

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* Notizblatt des Königl. bot. Gart. Berlin, 1897, 248.

On this point we are entirely in accord with M. Briquet, who writes: "Malgré la sympathie que nous éprouvons pour nos savants confrères du Musée de Berlin, nous voudrions voir leurs règles passées au crible d'une discussion générale après quelques années d'expérience, et cela dans l'intérêt de la nomenclature elle-même. Si chaque musée adopte un code particulier, on peut prévoir, étant donné les divergences qui existent actuellement, que l'on ne tendra pas à se rapprocher de l'uniformité désirée."

It is not, however, the rules in general, but one of them in particular, to which the recent action of Prof. Engler has attracted our attention. The rule in question has been criticized unfavourably by M. Briquet, by Dr. Britton, and by ourselves, and it might have been hoped that this similar expression of opinion on the part of those who are not otherwise entirely in accord would have suggested the desirability of its reconsideration. Such, however, has not been the case.

It may be worth while to quote the rule and the objections that have been made concerning it:—

"2. Ein Gattungsname wird aber fallen gelassen, wenn derselbe während 50 Jähre von dem Datum seiner Aufstellung an gerechnet, nicht in allgemeinen Gebrauch gewesen ist. Wurde derselbe jedoch als eine Folge der Beachtung der 'Lois de la nomenclature vom Jähre 1868' in der Bearbeitung von Monographieen oder in den grösseren Florenwerken wieder hervorgeholt, so soll er bei uns in Geltung bleiben."[†]

M. Briquet's comment runs thus; it will be observed that he considers the rule was directed primarily against another German botanist, and as he was in correspondence with Prof. Engler on the subject of the rules, he is likely to be well informed:—

"2. Cet article constitue la grande innovation des botanistes berlinois. La limite prescriptive de cinquante ans a pour but d'éliminer de la nomenclature une série de vieux vocables *génériques* remis en vigueur récemment par M. O. Kuntze et divers auteurs américains. Mais le principe de la prescription cinquantenaire est entouré de restrictions qui en rendent l'application délicate. . . . . Nous considérerions comme dangereux l'adoption *définitive* sans expérience préalable du principe de la prescription, tel qu'il est énoncé par les botanistes berlinois."[‡]

Dr. Britton wrote:—"The application of the ideas embodied in this paragraph would lead to great uncertainty in very many cases, and we do not believe that the Berlin botanists will long maintain them. How they can consistently decide on what is 'general use'

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[*] Bull. de l'Herb. Boissier, 1897, 774.

[†] "2.—The name of a genus is, however, allowed to lapse if it has not been in general use during fifty years, counted from the date of its establishment. If the name has, however, been revived in monographs or large floras as a result of following the 'Laws of Nomenclature of the Year 1868,' that name is to hold good."

[‡] Bull. de l'Herb. Boissier, Sept. 1897, 775.

as compared with what we may term 'special use,' is more than we can imagine; and who is to determine what descriptive volume is a 'monograph,' or what flora a 'large' one, is equally difficult to understand; and how are they to determine in many cases whether the author has or has not followed the Paris code of 1868? Or will calling a brochure a 'monograph' make it one? But it is to be remembered that these rules have been framed for the special use of Berlin botanists, and we shall be interested in observing the results."*

In our own remarks we urged the same difficulties:—

"2.—This rule seems to us open to serious objection. What is meant by 'general use'? How many citations are necessary to constitute such use, at what intervals of time, and by what class of author? What is a 'monograph'—is it of an order, a genus, or a species? and what flora is to be considered a 'large' one? How is it to be known in all cases whether the reviver of a name in such a work has so acted 'as a result of following the Laws of 1868'?"†

The application of the Berlin rules to which we would call attention consists in the adoption by Prof. Engler of the name *Lannea* for a genus of *Anacardiaceæ*. Until quite recently this was generally known as *Odina* Roxb.; and it is monographed under that name by Prof. Engler in the *Monographiæ Phanerogamarum*, iv. 263-274 (1883). During the last four years the Professor's views have undergone considerable variation, as the following will show.

In 1892,‡ the name *Odina* was still retained in a paper published in *Bot. Jahrbücher*, xv. 103-106, where several new species are described; and also in the *Hochgebirgsflora des trop. Afrika*, p. 288. In the same year, however, in *Nat. Pflanzenfamilien*, iii. 5, 153. Prof. Engler—not without a protest—follows Otto Kuntze in his restoration of *Calesiam* (or, as both spell it, *Calesium*) of Adanson, and renames the above species under that genus.

But in 1895 our author (*Pflanzenwelt Ost Afrikas*, Theil C, p. 244) returns to *Odina*, and adds a new species under that name. He gives no reason for the desertion of *Calesiam*, but it may be supposed that the Berlin Rules were in course of incubation, and that the Kuntzean method had fallen into disfavour.

In 1898 the application of the new rules results in a further change; and *Lannea* A. Rich. replaces both *Calesiam* (now restored to its original spelling) and *Odina*; another early name, *Haberlia*, is also sunk. The reasons for this are supplied in the following note:—

"Da die älteren Namen *Calesiam* und *Haberlia* nicht zur Geltung gekommen sind, so können sie vernachlässigt werden. *Lannea* A. Rich. wurde aber erst von Endlicher widerrechtlich zu Gunsten

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[*] Bull. Torrey Bot. Club, August, 1897, 416.

[†] Journ. Bot. August, 1897, 304–5.

[‡] We gather this from internal evidence; the volume is dated 1893. We are glad to note that since attention was called to this matter (Journ. Bot. 1894, 180) the dates of each part are given on the back of the title-page of each volume of the *Jahrbücher;* it would be useful if a complete list of dates for the earlier volumes were published.

des ein Jahr jüngeren Namens *Odina* Roxb. zurückgesetzt; somit muss *Lannea* A. Rich. bleiben."*

Considering how recently Prof. Engler himself gave additional currency to *Calesiam* by adding to it several new species, it is somewhat strange to learn on his authority that does not even "come under consideration"; and as the *Nat. Pflanzenfamilien* takes rank as the most important modern contribution to our knowledge of systematic botany, it might have been well to explain that the law which so excludes the name is a brand-new one "made in Germany," and only subscribed to by some of the botanists in Berlin.

But it is pertinent to inquire how far the restoration of *Lannea* is in accordance with the rule in question. We confess that, assuming the fact to be as stated—and we are aware that *Lannea* dates from 1831, although the title-page of the volume in which it appears is dated 1830–33—we should ourselves prefer the name *Lannea* to *Odina*. Yet not only has *Lannea* not been in general use during fifty years counted from the date of "its establishment," but, on the contrary, it has been allowed to lapse for more than half a century since it was established, being always during that period cited only as a synonym. Moreover, it is necessary to consider the second half of the rule, which modifies and governs the preceding. In no "monograph or large flora" has *Lannea* been more than mentioned as a synonym. On the other hand, *Odina* has been universally accepted in floras and monographs until recently, and in particular by Prof. Engler in his monograph of the order in 1883 and subsequently in *Nat. Pflanzenfamilien* in 1892. It would appear, therefore, that, according to the novel Berlin rule, *Odina* should be preferred to *Lannea*.

At the present time, therefore, this genus possesses three—or four, if we reckon the Kuntzean alteration of the spelling of *Calesiam*—names, each of which has received the sanction of a school of nomenclaturists. According to the "Rochester Code," *Calesiam* would be employed, and this name has been used by Mr. Hiern in the Welwitsch Catalogue (where four new species are referred to it); the Kuntzean school will call it *Calesium;* the mode of convenience favoured by Kew would retain *Odina;* while the Berlin practice, as we have seen, adopts *Lannea*. A new species, therefore, may be described under either of these names, according to the centre from which it is promulgated; and it will thus be necessary to look under each of these names to see whether any new species has appeared.

On this point, however, there is no need to theorize, as Prof. Engler himself has supplied us with sufficient examples, inasmuch as he has transferred the whole of the species described by himself and others under *Odina* and *Calesiam* (or *Calesium*) to *Lannea*. One will suffice as an illustration—the plant he now calls *Lannea Schweinfurthii*: the synonymy of this is—

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* "Since the older names *Calesiam* and *Haberlia* do not come under consideration, they may be neglected. *Lannea* A. Rich. was, however, formerly illegally set aside by Endlicher in favour of *Odina* Roxb., a younger name by a year; *Lannea* A. Rich. must therefore remain."—*Nat. Pflanzenfam.*, Nachtrage zu Teil ii.–iv. 213.

Odina Schweinfurthii Engl. Mon. Phan. iv. 273 (1883).
Calesium Schweinfurthii O. Kuntze, Rev. Gen. 151 (1891); Engl. in Nat. Pflanzenfam. iii. 5, 153 (1892).
Lannea Schweinfurthii Engl. *l.c.* Nachtr. 214 (1897); Bot. Jahrb. xxiv. 498 (1898).

In this last paper Mr. Hiern's new species of *Calesiam* are forthwith transferred to *Lannea*; an application of the "Rochester Code" would restore these to *Calesiam*—Dr. Kuntze would write *Calesium*—and would place Prof. Engler's last species under the same heading. Kew would, we imagine, settle the difficulty by retaining *Odina*.

Nor can it be said that possibilities are exhausted. Nothing would be simpler than for the Professor of Botany at some other centre to call his assistants together and formulate a proposal that the time-limit should date from the beginning of the century—a proposal which we have heard broached, and for which something may be said. In that case, he will be able to transfer the whole of the species to *Haberlia*—a name published by Dennstedt (Schlüssel Hort. Malab. p. 30) in 1818, and based upon the same material as *Calesiam* Adans.

It may be added that in his latest paper Prof. Engler has done scanty justice to his own synonymy, certain species published by him under *Calesium* not being so cited.

A NEW BRITISH FLORA.

Our readers will learn with interest that a new British Flora is in preparation. For some time it has been understood that the Rev. E. F. Linton was accumulating material with a view to a work of the kind, but he was not willing that any public announcement should be made of the fact. Now however that he has to some extent got the matter in hand, we have his permission to announce that, although some time must elapse before it can be ready for publication, a new Flora has been definitely decided upon.

The necessity for such an undertaking has long been apparent, not only to the field worker but to the student of books or herbaria. A comparison of the last edition of the *London Catalogue* with any of our existing floras will make this abundantly clear. Bentham's *Handbook*, admirable in its way, has never appealed to the critical botanist. Babington's *Manual*, which in its day revolutionized British botany, is in its latest edition seventeen years old, and it may be doubted whether any revision that was not to a great extent a re-writing would bring it into relation with the views of our present-day working botanists. Sir Joseph Hooker's *Student's Flora* is, and may possibly continue to be, the most generally useful of our floras, but it does not satisfy the student of critical forms. Although it might have been thought that the botany of these islands had long since been completely investigated, not a year passes without the addition to our list of some well-distinguished species, to say nothing of the numerous forms which swell the enumeration of such genera as *Rosa*, *Rubus*, *Hieracium*, and *Salix*. The investigations which have been made in these and many other genera—*Carex* and *Potamogeton* are only two out of many which might be mentioned—have long needed correlation; and the contents of this Journal during the years since the last edition of Babington appeared bear ample testimony to the increase of our knowledge in many directions during that period.

We understand that Mr. Linton will take the *London Catalogue* as a basis for his Flora, and in this—which by no means implies a slavish adherence to that useful list—we think he will do wisely. He will, as far as possible, describe each species or variety anew from living material, and will aim at making especially clear the distinctive features of closely-allied forms. While undertaking the work himself throughout, save perhaps in one or two genera, he will submit his manuscript where necessary to those who have specially devoted themselves to certain groups: in this way the unity of the work will be preserved, while the co-operation of specialists—which has been promised—will be ensured.

In some respects the Flora will be an advance bibliographically on any of its predecessors. A reference (with date) will be given for each species, as in the best continental floras—a feature, we believe, first attempted for England in Mr. W. R. Clarke's "First Records of British Flowering Plants," published in this Journal. The most recent continental works will be consulted. In a word, every care will be taken to make the new Flora thoroughly up to date; and those who know Mr. Linton's work both in the field and in the study better than ourselves are convinced that, taking all things into consideration, he is the best qualified of our present-day British botanists to carry out the undertaking in a satisfactory manner.

Mr. Linton's share in the preparation of the type-sets of brambles, willows, and hawkweeds which have been issued during the last few years must have enabled him to obtain considerable knowledge of these genera. We shall await with interest his dealing with the last of these, the number of which threatens to exceed either of the two others we have mentioned. At a time when continental varieties are claimed as additions to our British list on the slightest possible pretext, and when mere states or extreme forms of a series shading into one another are considered in some quarters worthy of varietal or even of specific rank, it is most desirable that a sane and well-balanced effort should be made to distinguish between these and plants which have a just title to inclusion in our text-books; and we believe Mr. Linton will carry out such an effort to the satisfaction of the field botanist and the student.

Another reason for the issue of a new Flora is to be found in the withdrawal of Mr. Arthur Bennett from the continuation of the supplement to *English Botany*. It is to be feared that no one will be found capable of carrying on this undertaking: and we confess that in our opinion it would be better that it should be allowed to lapse than entrusted to the care of any one who is not specially qualified for the task.

It may be of interest to add here that Mr. G. S. Boulger has for some time been engaged in revising and bringing up to date that very useful and popular book, Johns' *Flowers of the Field*. If this is thoroughly done, it will form a useful introduction to Mr. Linton's more complete work: and in this aspect it is satisfactory to know that Mr. Boulger has also adopted the *London Catalogue* as his standard of nomenclature.

Mr. Linton will be grateful for the offer of fresh specimens of interesting plants. His address is—Crymlyn, Bournemouth.

NOTES ON ASARUM.

By James Britten, F.L.S., and Edmund G. Baker, F.L.S.

The following remarks are the outcome of an inquiry addressed to one of us by Mr. W. W. Ashe, of Raleigh, N.C. Mr. Ashe, having printed a paper on "The Genus Asarum in Eastern America," in which he purposely ignored a Linnæan name, bethought himself that it might be well to have his species compared "with the Linnæan specimen," and forwarded material for that purpose. It seems to us that the inquiry should have been made before his paper was printed.

At the present day most botanists of repute are aware of the importance of consulting types. This is notably the case in America, where the example set by Asa Gray is followed by such men as Dr. Britton, Dr. Greene, Prof. Trelease, Prof. Bailey, and others, who, on their visits to this country, never fail to consult the old material preserved in the National Herbarium on which so many of the earlier species of American plants are founded. At the same time there are others, and not only in America, who avowedly ignore the old material and start afresh. This plan, which undoubtedly saves trouble to the botanist who follows it in exactly the same proportion as it must increase the difficulties of more thorough workers who succeed him, finds favour with Mr. W. W. Ashe.

Before quoting from Mr. Ashe's paper the passage in which he justifies this mode of proceeding, a question arises as to the paper itself. It is headed "Botanical Contributions from my Herbarium. No. I.," and a footnote says it was "issued Oct. 28, 1897, Raleigh, N.C." It bears no imprint either of publisher or printer, and consists of four octavo pages. There is no indication that it can be obtained anywhere, and no price is stated. Mr. E. P. Bicknell* refers to it as "a privately printed paper," and the question arises as to how far it can be regarded as a publication. There are nowadays so many botanical journals that it seems unwise to adopt a mode of printing which is, at least, eccentric; and we venture to hope that Mr. Ashe's subsequent "Contributions" will be more suitably published, as well as less open to criticism from a botanical point of view.

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* Bull. Torrey Bot. Club, 1897, 536.

Mr. Ashe states his case as follows:—

"The nomenclature of the Virginicum group presents some difficulty as to which species represents the original *Asarum virginicum* of Linnæus. Plukenet's figure (Alm. 55, t. 78, f. 2) to which Linnæus refers might represent any species of this group: it poorly figures *A. macranthum*; somewhat better *A. minus*; and might have been intended to represent either *A. Memmingeri* or *A. heterophyllum*. The Grovonian [*sic*] description does not add any information. I have thought it preferable to follow the practice of several European botanists and ignore, in such a case of uncertainty, the Linnæan name, as it represents a group of at least four species rather than a single plant."

If Mr. Ashe had taken the trouble to inquire as to specimens instead of publishing conclusions based on (what he considers) a doubtful figure and an imperfect description, he would have found that "the Linnean name," so far from representing "a group of at least four species," represents but one, and that there is no "uncertainty" whatever about it.

Linnæus bases his *virginicum* on the descriptive phrases employed by Gronovius and Plukenet, and on the figure of the latter. In Gronovius's herbarium are three specimens, which vary somewhat in appearance, as one has an old leaf persisting from the previous year, while the other two have younger leaves contemporary with the flowers. The large series of specimens which we have from Rugel show both old and new leaves on the same plant.

In the Sloane Herbarium we have three specimens from Plukenet, two of which (Hb. Sloane xc, fol. 20, and cii, fol. 154) are written up by himself, while the third (Hb. Sloane xcv, fol. 108) is referred by Sherard to Plukenet's figure. The specimen in vol. cii. looks at first sight somewhat different, as it has only young leaves. Mr. Ashe's view that Plukenet's figure may represent any of four species seems to us in the face of this evidence absolutely untenable; no one of his specimens is anything but *virginicum*, and although the figure is not (as sometimes happens) obviously drawn from any one specimen, there can be no doubt as to its correspondence with them. It is equally clear, from the specimens of his *A. minus* and of *A. heterophyllum* and *A. Memmingeri* which Mr. Ashe has been good enough to send us, that the first of these—*A. minus*—is identical with *A. virginicum* L., although the flower is somewhat larger than in the type-specimens.

A note may here be added on another *Asarum*, which, although first announced as a species in 1894, has already, by the careless liberality of American botanists, been enriched with a considerable synonymy, and cannot possibly maintain the name which they have so far agreed to bestow upon it. Mr. Small describes this in Mem. Torr. Bot. Club, iv. 150 (1893), as "*Asarum grandiflorum* (Michx.) Small," and points out that the plant has been "practically unnoticed by botanists since Rugel's collection of 1841," although it is no doubt the "*A. virginicum β grandiflorum* Michx."* of Duchartre in DC. Prod. xv. 1, 426 (1864). He cites as a synonym "*Homotropa macranthum* Shuttl. MSS. in dist. Rugel 1841." How this name may stand in distributed sets we cannot say, but it is certain that Shuttleworth named it in his own herbarium (now in Brit. Mus.) "*Asarum* (*Homotropa*) *macranthum* Shuttl. n. sp."

This name had a very brief existence, for in the same year came the "List of Pteridophyta and Spermatophyta,"† and Mr. Small, finding that Klotzsch had once had a *grandiflorum* (conclusively identified by Duchartre with *A. arifolium* Michx.), and mindful of the latest American rule, "once a synonym, always a synonym," promptly invented a fresh name—"*Asarum macranthum* (Shuttlw.) Small." Herein he is followed by Dr. Britton (Ill. Flora, i. 593) and Mr. Ashe (Bot. Contrib. i. 2). But none of these gentlemen appear to have noticed that in avoiding Scylla they have plunged headlong into Charybdis, for Sir Joseph Hooker, in the *Botanical Magazine* for 1888 (t. 7022), had already appropriated *macranthum* for a Japanese species; as this name has twice since been cited by Mr. Hemsley in two distinct publications, it would seem that English botanical literature is imperfectly consulted by our transatlantic friends.

What, then, is the species to be called? We confess that the original name *A. grandiflorum* Small seems to us satisfactory; but as the plant is an American citizen, and may be expected to conform to American ways, we suggest *A. Shuttleworthii* as a name likely to suit all parties. The synonymy of the two plants will run thus:—

Asarum macranthum Hook. f. Bot. Mag. t. 7022 (Oct. 1888); Hemsl. in Gard. Chron. 3rd S. vii. 421 (1890), and in Journ. Linn. Soc. xxvi. 359 (1891); non Small.

Asarum Shuttleworthii.

A. virginicum β grandiflorum "Michx." ex Duchartre in DC. Prodr. xv. 1, 426 (1864).

A. grandiflorum (Michx.) Small in Mem. Torr. Club, iv. 150 (1893), non Kl.

Homotropa macranthum Shuttl. ex Small, *l. c.*

A. macranthum (Shuttlew.) Small in Mem. Torr. Club, v. 136 (1893–4); Britton, Ill. Flora, i. 593 (1896); Ashe, Bot. Contrib. 1, p. 2 (1897).

We may note in passing that the very considerable range in the size of the flowers of *A. virginicum* suggests a doubt as to whether

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* Mr. Small observes that the name *grandiflorum* does not occur in Michaux's *Flora*, as Duchartre states, and suggests that Michaux named it in MS. We incline rather to think that Duchartre adapted the name from Michaux's phrase "flore maximo."

† Mem. Torr. Bot. Club, v. (1893–4).

Shuttleworth's plant may not after all be a large-flowered form of that species.

Mr. Bicknell (Bull. Torr. Club, 1897, 530) says "there is little doubt that Salisbury's name, *A. latifolium*, is a synonym" of *A. canadense*. Even that little may disappear, for Salisbury—who had singularly lax views as to the laws of priority—cites *A. canadense* as identical with his plant.

BIOGRAPHICAL INDEX OF BRITISH AND IRISH BOTANISTS.

By James Britten, F.L.S., and G. S. Boulger, F.L.S., F.G.S.

First Supplement (1893–97).

Five years having elapsed since the date to which we brought down our original work, it appears desirable to issue a supplement to include the names of botanists who have died between January 1st, 1893, and December 31st, 1897, together with some which were accidentally omitted from the original Index.

The present Supplement naturally follows the plan of the original work: serial sources of information previously consulted have now been examined down to the end of 1897, and few others require special mention. It may, however, be well to state explicitly that only deceased botanists are included in the list: this, by an oversight, was nowhere stated in the original Index.

The only work of importance in addition to those already cited in the Index is 'First Records of British Flowering Plants,' by W. A. Clarke, F.L.S. (1897); we refer to this as *Clarke*.

It is proposed on the completion of the publication of the Supplement in the *Journal of Botany* to reissue it separately in pamphlet form, together with one or two pages of minor corrections referring to the original work. The compilers will be glad to receive any assistance in drawing up these.

Acton, Edward Hamilton (1862–95): b. Wrexham, 16th Nov. 1862; d. Cambridge, 15th Feb. 1895. B.A., Camb., 1885. Chemist and physiologist. 'Practical Physiology of Plants' [with Francis Darwin], 1894. R.S.C. ix. 10. 'Eagle,' March, 1895; Journ. Bot. 1895, 127.

Alexander, William Thomas (1818–1872): b. 23rd June, 1818; d. 31st May, 1872. Assistant-Surgeon, R.N. On H.M.S. 'Plover' in East Indies and China, 1845–6. Collected ferns, mosses, &c., on Chinese coast, Chusan, Hongkong, and Loochoo Islands. Fungi of Cloyne, 1852. Journ. Bot. 1848, 273 (erroneously T. Anderson); 1853, 236; 1857, 333, 353; 1894, 294, 299. R.S.C. i. 44. Phyt. iv. 727. Bentham, Fl. Hongk. pref. 11.

Allom, Elizabeth Anne (fl. 1841). Of Margate. 'The Seaweed Collector . . . . illustrated with natural specimens from the shores of Margate and Ramsgate,' 1841; reissued, 1845. Jacks. 218.

Amherst, Countess (SARAH), (*née* **Thynne**) (d. 1838): d. 27th May, 1838; m. (1) Other, 5th Earl of Plymouth; (2) William, 2nd Baron (afterwards 1st Earl) Amherst, 1800. Travelled and collected in India, 1823–8. Wallich, Pl. Asiat. Rar. i. 1. *Amherstia* Wall.

Amos, William (fl. 1804). Of Brotherstoft, near Boston, Lincolnshire. Agriculturist. 'Minutes in Agriculture and Planting, illustrated with specimens of Natural Grasses,' 1804.

Anderson, Frederick W. (1866–91): b. Wisbech, 22nd June, 1866; d. New York, 22nd Dec. 1891. D.Sc., Montana, 1890. Went to America, 1881. Papers in Bull. Torrey Club and Bot. Gazette. Bot. Gazette, 1892, 78 (portr.).

Anderson, William (d. 1778): d. at sea, 3rd Aug. 1778. On Cook's second voyage as surgeon's mate, and on third voyage as naturalist. MS. descriptions of birds and plants in Brit. Mus. Nat. Hist. Plants from Australia, New Caledonia, Pacific Islands, &c., in Herb. Mus. Brit. Brown, Prodromus, 553. Dict. Nat. Biogr. i. 393. *Andersonia* Br.

[ANDERSON, T. *See* ALEXANDER, WILLIAM THOMAS.]

Archer, William (1830–1897): b. Enniscorthy, 6th May, 1830; d. Dublin, 14th Aug. 1897. Librarian R. Dublin Soc., 1876–1895. F.R.S., 1875. Papers on Desmids in Proc. Dublin Nat. Hist. Soc. iii.–v. (1859–65). Journ. Bot. 1874. Desmids and Diatoms in Pritchard's 'History of Infusoria,' ed. 4, 1861. Jacks. 158; R.S.C. i. 86; vii. 42; ix. 62. Irish Naturalist, 1897, 253 (portr.).

Atkinson, William (1765–1821): b. Dalton-in-Furness, Lanc., 3rd May, 1765; d. Dalton, 8th Dec., 1821; bur. Dalton. Solicitor, of Dalton. Contributed to 3rd ed. of With. Arr. List of plants in 1805 ed. of West's 'Antiquities of Furness.'

Babington, Charles Cardale (1808–95): b. Ludlow, Shropshire, 23rd Nov. 1808; d. Cambridge, 22nd July, 1895; bur. Cherry Hinton, Cambridgeshire. B.A., Camb., 1830. M.A., 1833. F.L.S., 1830. F.R.S., 1851. Prof. Bot., Cambridge, 1861. 'Flora Bathoniensis,' 1834; Supplement, 1839. 'Primitiæ Floræ Sarnicæ,' 1839. 'Manual of British Botany,' 1843; ed. 2, 1847; ed. 3, 1851; ed. 4, 1856; ed. 5, 1862; ed. 6, 1867; ed. 7, 1874; ed. 8, 1881. 'Flora of Cambridgeshire,' 1860. 'British Rubi,' 1869. In Iceland, 1846. Herbarium of nearly 50,000 sheets and library bequeathed to University of Cambridge. Pritz. 10, 11; Jacks. 517; R.S.C. i. 136–9; vii. 62; ix. 91. Journ. Bot. 1895, 257, with portr. 'Memorials,' with portr., 1897. Portr. by W. Vizard at St. John's Coll., Cambridge. *Babingtonia* Lindl. = *Bæckia*.

Baillie, Edmund John (1851–97): b. Hawarden, Cheshire, 4th May, 1851; d. Chester, 18th Oct. 1897. Seedsman. F.L.S., 1883. 'The City Flora' in Proc. Chester Soc. Nat. Sci., 1878. Journ. Bot. 1897, 464.

Balfour, Edward Green (d. 1889). Surgeon-General, Madras. 'Remarks on Gutta Percha,' Athenæum, Nov. 22nd, 1855. 'Cyclopædia of India' (largely botanical), 1857. 'Timber-trees of India,' 1858; ed. 2, 1862; ed. 3, 1870. Jacks. 518; R.S.C. i. 170; Leopoldina, 1889, 220.

Balfour, Thomas Alexander Goldie (1825–95): b. Edinburgh, 1825; d. Edinburgh, 10th March, 1895. Youngest brother of John Hutton Balfour. M.D., Edinb., 1851. F.B.S.E., 1868; Pres., 1877–9. F.R.S.E., 1870. 'Dionæa muscipula,' Trans. Bot. Soc. Ed. xii., xiii. R.S.C. ix. 109; Trans. Bot. Soc. Ed. xx. 449.

Bancroft, Joseph (1836–94): b. Manchester, 1836; d. Brisbane, Queensland, 16th June, 1894. M.D., St. Andrew's, 1859. Practised in Nottingham, and from 1864 in Brisbane. Investigated properties of *Duboisia*, *Alstonia*, &c. 'Contribution to Pharmacy for Queensland,' 1886. Journ. Bot. 1894, 288; Gard. Chron. 1894, ii. 255.

Barnard, Edward (1786–1861): b. 14th March, 1786; d. 13th Dec. 1861. F.L.S., 1818. "Devoted principally to horticultural pursuits." Sec. R. Hort. Soc. Proc. Linn. Soc. 1861–2, lxxxv. R.S.C. i. 184. Bot. Reg. 1029. *Barnardia* Lindl. = *Scilla*.

Bateman, James (1811–97): b. Rodivale, Bury, Lanc., 1811; d. Worthing, Sussex, 27th Nov. 1897. M.A., Oxon, 1845. F.R.S. F.L.S., 1833. 'Orchidaceæ of Mexico,' 1837–41. 'Odontoglossum,' 1864–74. 'Second Century of Orchidaceous Pl.,' 1864–70. Pritz. 16; Jacks. 137–8, 368; Gard. Chron. 1871, 1514 (portr.); 1897, ii. 410; Orchid Review, 1897, 10; Alumn. Oxon. 1897, ii. 436. *Batemannia* Lindl.

Baxter, William Hart (1826?–90): b. 1826?; d. Oxford, 19th June, 1890. Son of William Baxter (1). Curator of Oxford Garden from 1854. Assisted Loudon (Hort. Brit. ed. 1850, &c.). Gard. Chron. 1890, 49, 797.

Beckwith, William Edmund (1844–92): b. Eaton Constantine, Salop, 1844; d. Shrewsbury, 22nd July, 1892; bur. Eaton Constantine. Ornithologist. Papers on Shropshire Plants in Journ. Bot. 1881–2. Plants in Herb. Mus. Brit. R.S.C. ix. 164.

Beesley, Thomas (1818–96): b. Banbury, Oxon, 28th March, 1818; d. Banbury, 15th May, 1896. Druggist. Geologist. Contrib. list of pl. to Alfred Beesley's 'History of Banbury,' 1841; assisted Mr. Druce in 'Flora of Oxfordshire.' Herb. in possession of Mr. G. C. Druce. Pritz. 19; R.S.C. vii. 123; Pharm. Journ., Sept. 5, 1896; Journ. Bot. 1896, 440.

Beever, Mary (c. 1800–83): b. Ardwick, Manchester; d. Coniston, 31st Dec. 1883. Moved to Thwaite House, Coniston, 1827. Sent *Gentiana Pneumonanthe* to Baxter in 1836 ('Brit. Phænog. Bot.' tt. 185–7); and ferns to Newman and E. J. Lowe. Correspondent of J. G. Baker ('Fl. Lake District') and of John Ruskin ('Hortus Inclusus'). W. G. Collingwood, 'John Beever's Practical Fly-fishing,' 1893, pref. *Lastrea Filix-mas* var. *Beevorie* Lowe.

Beever, Susanna (1805-93): b. Manchester?, 27th Nov. 1805; d. Coniston, Lancashire, 29th Oct. 1893. Sister of preceding. Sent *Radiola* to Baxter ('British Phænog. Bot.' t. 188). Correspondent of Baker and Ruskin (see preceding). Naturalist, 1894, 290.

Bellairs, Nona Maria Stevenson (d. 1897): d. Bournemouth, 14th May, 1897; bur. Bournemouth Cemetery. 'Hardy Ferns' (British), 1865. 'Wayside Flora,' 1866. Pritz. 20; Jacks. 520.

Bennett, George (1804-93): b. Plymouth, 31st Jan. 1804; d. Sydney, 29th Sept. 1893. M.R.C.S., 1828. M.D., Glasgow, 1859. F.L.S., 1831. Practised in Sydney, 1836. Zoologist. Contrib. to Loudon's Mag. Nat. Hist., 1832; Journ. Bot. 1866-72. 'Wanderings in New South Wales,' 1834. 'Gatherings of a Naturalist in Australasia,' 1860. Sent plants to Kew. Jacks. 521; R.S.C. i. 273; vii. 138; ix. 190; Journ. Bot. 1894, 191; Proc. Linn. Soc. 1893-4, 27. *Antiaris Bennettii* Seem.

Benson, Robson (d. 1894): d. Bath, 22nd Oct. 1894. F.L.S., 1870. General in Indian army. In India, 1839-77. In charge of Rangoon Gardens, 1865-9; of Madras Bot. Gardens, 1872-6. Discovered many orchids in Burmah. Proc. Linn. Soc. 1894-5, 30. *Vanda Bensoni* Bateman.

Bent, James Theodore (1852-97): b. Liverpool, 1852; d. London, 5th May, 1897. B.A., Oxon, 1875. Travelled and collected in Hadramaut, 1893-4; in Arabia Felix, 1894-5; and in Nubia and Socotra, 1895-6. Botanical results, Kew Bulletin, 1894, 328; 1895, 180. Plants at Kew. Kew Bull. 1897, 206; Allibone Supp.

Bentham, Lady (Mary Sophia) (*née* Fordyce) (1765?-1858): b. London?, 1765?; d. 18th May, 1858; m. 1796, General Sir Samuel Bentham. Daughter of Dr. George Fordyce. Mother of George Bentham. "A very good botanist," A. Gray, Letters, 188. Had a herbarium. Journ. Bot. 1894, 315.

Bentley, Robert (1821-93): b. Hitchin, Hertford, 1821; d. Earl's Court, London, 24th Dec. 1893; bur. Kensal Green Cemetery. M.R.C.S., 1847. F.L.S., 1849. Lecturer on Bot., London Hospital; Prof. Bot., King's Coll., London. 'Manual of Botany,' 1861; ed. 4, 1881. 'Eucalyptus,' 1874. 'Botany,' 1875. 'Medicinal Plants' (with H. Trimen), 1875-80. Pritz. 22; Jacks. 521; R.S.C. i. 282; ix. 192; Journ. Bot. 1894, 64; Pharm. Journ. 1893-4, 559; Proc. Linn. Soc. 1893-4, 28; Allibone Supp.

Bidwell, Henry (1816-68): b. Albrighton, Salop, 8th July, 1816; d. Albrighton, 13th March, 1868. Local Sec. Bot. Soc. London. M.D. F. Bot. Soc. Ed. Had a herbarium.

Blomefield, Rev. Leonard, *né* **Jenyns** (1800-93): b. London, 25th May, 1800; d. Bath, 1st Sept. 1893. M.A., Camb., 1825. F.L.S., 1822. F.G.S., 1835. Curate of Swaffham Bulbeck, Cambs., 1823; vicar, 1828-49. Founded Bath Nat. Hist. Club, 1855. 'Naturalists' Pocket Almanack,' 1843-7, 'Bath Flora,' Proc. Bath Field Club, i. (1866), 23. Library and herbarium in more than 40 vols. presented to Bath Institution. R.S.C.

vii. 198; ix. 269; 'Chapters in my Life,' 1889; Journ. Bot. 1893, 320; Nature Notes, 1893, 193; Allibone Supp.; Darwin's Life and Letters, i. 54; Gard. Chron. 1893, ii. 307. Photo. at Linn. Soc.

(To be continued.)

SHORT NOTES.

THE BRITISH CAREX FRIGIDA (p. 41). — In my notes on *Carex* in this Journal for 1897 (p. 259) I purposely took no notice of the *Carex* so named, as I was aware that Mr. E. F. Linton was occupied with the plant. But from the moment I saw the original specimens gathered by Sadler, I was convinced it was not the *C. frigida* of Allioni. Other and better authorities than myself still called it so, and I was contented to let it rest until Mr. Linton had concluded his work. I may now say I cannot consider it to be Allioni's plant, and Mr. Linton's name may well be accepted for it. It would indeed have been a very interesting distribution, if it had been the plant of Allioni. Unless Drejer's var. *alpina* of *C. binervis* Sm. be the Scotch plant (I have not yet been able to see a type-specimen), I think it may be an endemic form.—ARTHUR BENNETT.

SINAPIS ORIENTALIS Murr. The forms of *Sinapis arvensis* L. with hispid pods, common in many parts of England and not separated by English botanists, were recognized as a species by Murray and Linnæus, and are kept up as varieties by continental writers under the names var. *villosa* (Mér.) and var. *orientalis* (Murr.).—S. T. DUNN.

WANDSWORTH ALIENS. — It has been ascertained upon enquiry that the locality for aliens in the neighbourhood of Wandsworth Distillery, made famous nearly forty years ago by the researches of Irvine, Britten, and others, has been built over or turned into private gardens, so that any species that still lingered on have now probably disappeared. A little to the west of the steamboat-pier grows abundance of *Sisymbrium Columnæ* Jacq. and a quantity of *Rumex Patientia* L.—S. T. DUNN.

RANUNCULUS PETIOLARIS. — I recently learned from Mr. Arthur Bennett that this name is preoccupied; it was used by Bonpland, Humboldt, and Kunth in their *Nova Genera et Species Plantarum*, v. 45 (1821), when describing a Mexican buttercup, which their figure (no. 428) shows to be a totally different plant from mine. The West Highland *Ranunculus* published in this Journal for 1892, p. 289, under this title may bear the name of *R. scoticus* for those who, like myself, believe it to be specifically (or subspecifically) distinct; if it is regarded as a variety, I suppose that it can stand as *R. Flammula* L. var. *petiolaris* Lange, according to my original description in this Journal for 1888, p. 230.—EDWARD S. MARSHALL.

MASTIGOPHORA WOODSII (Hook.) Nees IN INVERNESS-SHIRE.—I have found this hepatic in some quantity in Moidart, on the west coast of the above county. It grows in a ravine at 1200 ft. alt.; also, though more sparingly, at 500 ft. At the upper station it has the larger form of *Pleurozia cochleariformis* mixed with it, and close at hand are *Herberta adunca* and *Polytrichum alpinum*. I had previously found it in 1892 on an adjoining mountain on the same watershed, but I do not know at what altitude. This species is given in the *London Catalogue of Mosses and Hepaticæ*, ed. 2, for Province 17, North Highlands (Ross, Sutherland, and Caithness), as well as for Ireland. In Wallace's *Island Life*, ed. 2, it is mentioned on the authority of Mr. Mitten as being "found in Ireland and the Himalayas, but unknown in any part of Continental Europe," no reference being made to its occurrence in Britain. — SYMERS M. MACVICAR.

NOTICE OF BOOK.

The Flora of Berkshire; being a Topographical and Historical Account of the Flowering Plants and Ferns found in the County; with short Biographical Notices of the Botanists who have contributed to Berkshire Botany during the last three Centuries. By GEORGE CLARIDGE DRUCE, Hon. M.A. Oxon., sometime Sheriff of the City of Oxford, Curator of the Fielding Herbarium; author of 'The Flora of Oxfordshire,' 'The Flora of Northamptonshire,' &c. Oxford: at the Clarendon Press. 8vo, pp. cc, 644. Price 16s. net. 1897 [1898].

IT is difficult to believe that eleven years have passed since Mr. Druce published his *Flora of Oxfordshire*. Such, however, is the case; and no sooner was that work out of hand than its author, with characteristic enthusiasm, devoted himself to the investigation of the neighbouring county of Berks. The results of his ten years' work are now before the botanical public in the handsome volume which—in spite of the date "1897" on its title-page—has only been published during the last month.

As an examination of the new Flora reveals many points which demand criticism, I am anxious at the outset to express my admiration for the zeal and industry which Mr. Druce devotes to his botanical work. There is probably no British botanist whose leisure—which Mr. Druce tells us is in his case "scanty"—is more ungrudgingly spent in collecting and examining plants; and I doubt whether any local flora contains the results of more individual work than the book now before me. Not only in the field but in the study Mr. Druce pursues his botanical investigations with unwearying enthusiasm; and his volume shows an acquaintance with botanical literature as extensive as his knowledge of the plants themselves.

And yet—the truth must be told—this most recent addition to our county floras cannot be regarded as satisfactory. It is distinctly inferior to the *Flora of Oxfordshire*, and that in a degree exactly proportionate to its greater pretentiousness. The *Flora of Oxfordshire* contained about 600 pages; the *Flora of Berkshire* has

800, of which at least a quarter might have been omitted, not only without detriment, but with positive gain to its usefulness. Take the introduction. Mr. Druce thinks it necessary to give not only the plants characteristic of each geological formation, for which there is something to be said—why is "Kimmeridge" always spelt with only one m?—but the flora of very numerous localities receives a separate enumeration: thus p. lxxx begins—"The Kennet valley, in addition to the plants already mentioned, affords, among others, the following interesting species," the whole remaining portion of the page being occupied with names of plants. Nearly a hundred pages are taken up with biographical matter—some of it paraphrased from similar accounts in the *Flora of Oxfordshire*—connected with those who have contributed, however slightly, to a knowledge of Berkshire plants: this would make, with some few corrections, an admirable foundation for a history of British botany, but is absolutely out of place in a local flora. The space thus lavished might well have been occupied by some account of the mosses, fungi, and other cryptogams; it is strange at this date to find that no information whatever is given about these components of the flora.

Some connection, however, exists between these matters and the flora of the county; but this cannot be said for a vast deal of the information given. Mr. Druce seems to think the book affords a fitting opportunity for introducing to the botanical world his views about nomenclature, whether of orders, genera, species, or varieties. This I consider a mistake. If his conclusions are worth printing, a local flora is emphatically not the place for them. What is the advantage, in a local flora, of substituting "Gunneraceæ" for "Haloragaceæ"? To make matters worse, Mr. Druce wastes space by quoting synonyms for his orders—sometimes with absurd results, as when he cites *Cassiaceæ* of Link (Handb. ii. 135) as synonymous with *Leguminosæ*.* Link places *Cassiaceæ* as Ordo iii. of his Subclass *Leguminosæ*, and, as might be expected from its name, the order does not contain a single British plant!

Of course this citation of synonyms occupies in the aggregate a considerable amount of space. Mr. Druce says he has given them (for the species) from various British books and the *Index Kewensis*, "in order to make the work more useful to those readers whose botanical library is limited." Had he been content with this no great harm would have been done, but unfortunately this is far from being the case. Four out of the seven synonyms given under *Buda rubra* do not come under this rule; nor do either of those cited for *Stellaria uliginosa*. As a matter of fact, the Flora is made a pretext for foisting upon botanical literature a number of new names, both of species and varieties, which seem to be created mainly in order that Mr. Druce may have the pleasure of putting "mihi" after them. The treatment of the genus *Stellaria* exemplifies Mr.

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* On p. clxxxvii Mr. Druce speaks of the name "*Leguminiferæ*" as "so generally used" that he has "not attempted to replace" it; yet throughout the body of the book he calls it *Leguminosæ*.

Druce's methods. He retains this name, but at the end we find the following:—

"*Obs.* Strictly speaking the generic name *Alsine* takes precedence of *Stellaria*, as it comes first in the *Species Plantarum*, and has been adopted in preference in the American Check-list."

Now it is quite true that some American botanists have agreed that priority of place in a book entitles to precedence; but the suggestion is not so much as referred to in the Berlin rules, and is opposed both to general practice and common sense; while the adoption of a name in "the American Check-list" is hardly convincing. Moreover, Mr. Druce does not himself follow this rule—either here or elsewhere—*e. g.* under *Buda* and other places. What he does is to increase synonymy by citing as "synonyms" names here published for the first time! Thus under *Stellaria palustris* we find "*Alsine palustris*, mihi, not of Kellogg"; under *S. umbrosa* Opiz (here retained as a species), "*Alsine umbrosa* mihi." Under *S. aquatica* is a mysterious synonym "*Alsine aquatica*, leges"; this is corrected on p. cxcix to "Britton in Mem. Torr. Club, v. (1894) 356." "Leges," however, as an authority is found on p. 151, in the synonymy under *Vicia gemella;* I could not imagine what was meant, but Mr. Druce kindly informs me that he had intended thus to signify that the names to which it was appended should stand, if the "laws" which insist on the retention of the old specific name are observed, but that on reconsideration he struck it out of his MS., so that its retention in one or two places is accidental.

A considerable amount of space is wasted in useless repetitions, and unnecessary citations; as well as over records of the casuals—often of the most trivial kind. Thus *Couringia orientalis*, which occurred twice by a railway and once by a racecourse, has five lines of synonymy and seven of gossip* about the name: for *C. austriaca*, Mr. Druce not only gives this new name (it having hitherto been called Co*n*ringia), but kindly suggests another which may be employed in case *Couringia* be disallowed—all this about a plant which once occurred on some waste ground! Does Mr. Druce seriously suppose that the botanists of the world will feel bound to consult the *Flora of Berkshire* in order to feel sure that he has not in some obscure paragraph suggested a new name for some plant which once appeared on a rubbish-heap in that county?

I propose to give in a separate article an example of Mr. Druce's treatment of species and their nomenclature; and now pass to a consideration of two or three of his numerous varieties.

In a note in this Journal for 1897 (p. 145) I expressed a view which is indeed common among botanists as to the undesirability of raising to varietal rank plants which differ from the type in some trivial or even accidental character. Mr. Druce is an old offender in this matter, and it is to be regretted that in his new Flora he pursues what I cannot but feel to be a mistaken course with greater enthusiasm than ever. The fact that in the last edition of the *London Catalogue* the great bulk of his then published varieties were ignored might have shown him that they were regarded by some as of doubtful value, nor can it be anticipated that those which now make their appearance will be more fortunate. In some cases Mr. Druce identifies, on evidence which cannot be considered as sufficient, certain British plants with named continental varieties; in others he has himself named for the first time forms which appear to him worthy of distinction. I propose to consider one or two examples of each.

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* Mr. Druce says "this spelling *appears to be* a misprint for *Conringia*"—a somewhat excessively cautious statement, as may be seen by consulting Mr. Jackson's note in Journ. Bot. 1888, 90.

Malva moschata. "Var. *Ramondiana*, Gren. and Godr. *l. c.* has all the leaves entire and dentate; . . . specimens were sent to the *Bot. Exch. Club* in that year." Mr. Druce in the Exchange Club Report for 1895 (p. 471) certainly speaks of his plant confidently as *Ramondiana*, but Mr. E. G. Baker, who has made a special study of *Malvaceæ*, appends a cautious note: "This certainly must closely approach var. *Ramondiana*, but I only know this from the description, which is 'feuilles *toutes* entières, dentées.' The upper leaves here are certainly lobed." In other words, the plant does not agree with the description of the type, to which it is unhesitatingly referred by Mr. Druce, without any reference to Mr. Baker's qualified opinion.

Helleborus viridis. "Our plant is the var. *occidentalis* (Reuter, Cat. Grain. 1868 (see Schiffn. Mon. Helleb. 138), as a species) Druce in Journ. Bot. (1890) 227.* It appears to be the common western form, chiefly differing from the type in being glabrous." A reference to Schiffner, whose monograph would have been more conveniently cited as in Engler's *Bot. Jahrbuch*, xi. 92–122, shows a much more careful dealing with Reuter's plant, which is retained as a subspecies, with a long diagnosis stating the numerous points in which it differs from typical *viridis*. Mr. Druce does not seem to have seen Reuter's plant, nor does he tell us how far the British form agrees with it, save in being glabrous: are we, on his view of what it "appears to be," to identify our plant with Reuter's? If so, we will not in any case call it "var. *occidentalis* Druce"; for an earlier varietal name is "var. *Smithianus* A. Br. in sched." which was published by Dr. Schiffner (*l. c.* 118) in 1889.

Iberis amara. "Var. *ruficaulis* (Lej.) DC. Syst. ii. 399 (1821), differing in its smaller size and purplish flowers, occurs occasionally with the type. . . . Mr. Tufnail tells me it was quite a feature at the back of Streatley woods this summer." It does not seem to have occurred to Mr. Druce that a plant called "ruficaulis" would present other characters of differentiation than "smaller size and purplish flowers"; but it is indeed surprising to find that one of these two characters, if such they can be called, exists neither in Lejeune's original description (*Fl. Spa*, ii. 58 (1811) nor in DeCandolle, *l. c.* Lejeune (who, by the way, distinctly calls it "var." and speaks of it as "la variété") says specifically "fleurs blanches," and DeCandolle says nothing as to the flowers differing from the "flores albi" of typical *amara*. Everyone who knows the candytuft where it whitens the fields, knows also the purple-flowered form which, as Mr. Druce says, "occurs occasionally with the type"; but who would dream of naming it as a distinct variety?

These three examples, taken literally at random, will suffice to show the evidence on which Mr. Druce would add new forms to our British lists. It is only fair to say that occasionally Mr. Druce enunciates a sound principle which it is to be regretted he has not more generally followed; thus, after having identified six of the Jordanic species of *Erophila*, he says: "I cannot claim certainty for the foregoing determinations, as without type-specimens it is most difficult in such critical forms to be certain of the correct identification." In this case, however, one is tempted to ask why "type-specimens" were not consulted, as many of Jordan's species, authenticated by himself, are in the National Herbarium; and still more why, in such uncertainty, more than a page should be devoted to general talk and quasi-determination of these "micro-species."

The following are examples of the new varieties established by Mr. Druce in the present work:—

Malva sylvestris. "Var. *lasiocarpa*, mihi. The carpels are described in English Botany as being glabrous, but specimens have been found with hairy carpels at Abingdon. . . . In other respects the plant does not appear to differ from the type." On this most variable of characters Mr. Druce does not hesitate to encumber our nomenclature with a new name. But this is not all. How is Mr. Druce's plant distinguished from the var. *dasycarpa* of Beck (Fl. Nieder-Oesterr. 538) (1890)—"Theilfruchte reichlich Kurzhaar g"—with which Rouy and Foucaud (Fl. France, iv. 34) (1837) unite in part var. *eriocarpa* Boiss. (Fl. Or. i. 819)? These authors add other characters besides that of "carpelles poilus," which tend to confirm the distinctness of the plant as a variety. Incidentally one notices "var. *micrantha* Bromf. (Fl. Vectensis, 80) (1856). This was described by its author as having flowers only a quarter* of the normal size, and of a deeper and more uniform purple colour." Bromfield gives other characters, but even the above hardly justify Mr. Druce in including this name in his book on the strength of "plants with flowers about half the normal size."

Vicia gemella Crantz. "Var. *tenuissima* mihi. Leaves narrow and acute. Hilum as in *V. gemella*. *V. gracilis* auct. var. not of Lois. *E. tetraspermum* L. var. *tenuifolium* Fries, Fl. Suec. 23. *E. tenuissimum* Pers. Syn. ii. 309."

I cite this note in full, because it presents examples of various (although not all) of the inconveniences to which Mr. Druce's method of dealing with names must give rise. The name *tenuissima* "mihi," is, I presume, taken from Persoon's *Ervum tenuissimum*. This is, of course, a doubtful species, but, so far as I have looked up the matter, the best-known authorities—e. g. DC. (Prod. ii. 367), Nyman (Conspect. 212), Boissier (Fl. Orient. ii. 496), Koch (Syn. ed. i. 198 (1838), ed. 3, i. 689 (1892), Willkomm & Lange (Prod. Fl. Hisp. ii. 307), and the *Index Kewensis*—agree in referring it to *V. gracilis* Lois. I am curious to know on what ground Mr.

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* "Scarcely a quarter" are Bromfield's words.

Druce places Persoon's plant as a variety of *V. gemella.* The diagnosis of the new variety consists in the narrowness and acuteness of the leaves, for the hilum is "as in *V. gemella*" (the type), and so did not require mention: here again we have a slight and variable character adopted as the diagnosis of a variety. It is undoubtedly true that *V. gemella* has at times been mistaken for *V. gracilis*, though no one who had consulted Loiseleur's excellent figure could make such a mistake: at least one of the localities (Wolvercote) for *V. gracilis* given in the *Flora of Oxfordshire* belongs to *V. gemella* and (as Mr. Druce informs me) to his var. *tenuissima*, and I suspect the plant needs confirmation as an Oxfordshire species. As to the "var. *tenuifolium* Fries Fl. Suec. 23"—it should be 109—all that Fries says of it is "Var. *tenuifolia*, quæ potius forma primaria"; so that Mr. Druce's citation can only be based on inference.

Many examples might be given of named varieties for which even less is to be said than for this vetch; e. g. "*Scilla festalis* Salisb. var. *bracteata* mihi; in this form the bracts are often so much developed as to considerably exceed the flowers." This form, which is not uncommon, is referred to by Mr. Archer Briggs in his admirable *Flora of Plymouth*;—he, however, thought it sufficient to speak of it as "a plant with extremely long bracts, the longest more than three times as long as the flower"—a reference more in accordance both with modesty and common sense.

This review is far too long, but it might be indefinitely extended. Mr. Newbould used to say of Pfeiffer's *Nomenclator* that there was material for a paper in every entry: I do not think I exaggerate when I say that there is matter for criticism on every page of Mr. Druce's book.

In conclusion, I am anxious to make it clear that, so far as the county flora is concerned, Mr. Druce has done his work well and thoroughly. I have already expressed my conviction that no similar undertaking has involved more field work, and that the author has spared neither time nor trouble in its compilation. It is when he strays from the lines of a local flora into general observations that he exposes himself to adverse criticism, and diminishes the gratitude which our field-botanists feel towards one who adds an important contribution to the knowledge of British plants. It has always been my hope that Mr. Druce may see his way to completing his botanical history of the West Thames subprovince by publishing a flora of Buckinghamshire, for which it is understood he has already collected much material. If in doing this he will confine himself strictly to the matter in hand, the reviewer of his work will have a pleasanter task than has fallen to my lot on the present occasion.

James Britten.

*ARTICLES IN JOURNALS.**

Ann. Scott. Nat. Hist. (Jan.). — S. M. Macvicar, 'On the Flora of Tiree.'—J. W. H. Trail, 'Topographical Botany of Scotland.'

Bot. Centralblatt (Nos. 5–8). — M. Britzelmayr, 'Revision der Diagnosen von Hymenomyceten Arten.' — A. Weberbauer, 'Zur Anatomie der Kapselfrüchte.' — (No. 7). B. Fedtschenko, *Abies Semenovii*, sp. n. — (No. 8). F. Ludwig, 'Die pflanzlichen Variationscurven und die Gauss'sche Wahrscheinlichkeitscurve.'

Bot. Gazette (22 Jan.). — F. Noll, 'Julius von Sachs' (portr.).—C. F. Millspaugh, 'Euphorbias of Dr. Palmer's Durango Collection.' —J. Erikson, 'Research into Grain Rust.' — K. E. Golden & C. G. Ferris, 'Red Yeasts' (2 pl.).—T. Holm, '*Cynodon* or *Capriola?*'—G. L. Clothier, 'Root propagation of *Ipomœa leptophylla*.' — J. Schneck, '*Aphyllon virginianum*.'—C. Warnstorff, '*Bidens connatus*.'

Bot. Notiser (häft i.: 15 Feb.—S. Murbeck, 'De nordeuropeiska formerna af slägtet *Agrostis*.' — M. Heeg, 'Über einige Arten der Gattung *Riccia*.'—H. G. Simmons, 'Algologiska Notiser.'

Bot. Zeitung (16 Feb.). — 'Ueber die Staubgrübchen an den Stämmen und Blattstielen der Cyathaeaceen und Marattiaceen.'

Bull. de l'Herb. Boissier (Jan.). — F. N. Williams, *Rhodalsine* (1 pl.). — E. Fischer, 'Schweizerische Rostpilze.' — C. Müller, 'Bryologia Serræ Itatiaiæ' (Brazil; *Cladostomum*, gen. nov.).—Id., 'Plantæ Hasslerianæ.' — R. Chodat, 'Études de biologie lacustre.' —E. Autran, Nicolas Alboff. — J. Briquet, *Pimpinella Bicknellii*, sp. n.—P. Cheneyard, *Anacamptis pyramidalis* var. *tanayensis*.

Bull. Torrey Bot. Club (25 Jan.).—M. A. Howe, 'Anthocerotaceæ of N. America' (6 pl.). — C. C. Curtis, 'Evolution of Assimilative Tissue in Sporophytes.' — A. M. Vail, 'Studies in Asclepiadaceæ.' —J. K. Small, New species of *Eriogonum*; *Acanthoscyphus*, gen. nov. (Polygonaceæ).

Gardeners' Chronicle (29 Jan.).—*Crassula columnaris* (fig. 23).—(12 Feb.). *Passiflora edulis* (fig. 36). — (19 Feb.). 'The genus *Asphodeline*' (figs. 43–45). *Didiera mirabilis* (fig. 42).

Journal de Botanique (16 Jan., 1 Feb.). — M. Mirande, 'Malate et malophosphate de calcium dans les végétaux.' — (16 Jan.). —. Hué, 'Les *Ramalina* à Richardmesnil.' — G. Martel, 'Diagramme floral des Crucifères et des Fumariacées.' — (1 Feb.). E. Bescherelle, *Rhacopilum pacificum*. — L. Vidal, 'La cause des faisceaux dans le réceptacle floral des Labiées.'

Nuov. Giorn. Bot. Ital. (Jan.).—A. Baldacci, 'Collezione botanica d' Albania' (concl.). — R. Bellini, 'Autografi dell' 'Ecphrasis' di Fabio Colonna.' — G. B. Traverso, 'Flora urbica Pavese.' — M.

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* The dates assigned to the numbers are those which appear on their covers or title-pages, but it must not always be inferred that this is the actual date of publication.

Abbado, 'L'ibridismo nei vegetali.' — S. Sommier, 'Aggiunte alla florula di Capraia.'

Oesterr. Bot. Zeitschrift (Feb.). — S. Murbeck, *Alectorolophus asperulus*, sp. n.—K. Fritsch, 'Zur Systematik der Gattung *Sorbus*' (cont.). — M. Schulze, 'Die Orchideen Deutschlands,' etc. — F. Pfeiffer R. v. Wellheim, 'Zur Fixirung und Praeparation der Süsswasseralgen.' — J. Rick, 'Zur Pilzkunde Vorarlbergs' (concl.).— C. Baenitz, 'Ueber seltene und neue Rubi und Rubus-Hybriden' (concl.).

BOOK-NOTES, NEWS, &c.

The *Journal of the Royal Microscopical Society* for December contains an important "Contribution to the Freshwater Algæ of the South of England," by Messrs. W. & G. S. West. Many new species are described, and the paper is illustrated by two plates, which might have been printed on better paper, reproduced by photography from Mr. G. S. West's drawings. Mr. A. W. Bennett adds as an "appendix" a page of localities for freshwater algæ in Middlesex and Surrey, but we do not gather that these have been confirmed by the Messrs. West—a fact which should be remembered when the paper is quoted.

The National Herbarium has lately acquired a set of the plants collected in the Transvaal by Dr. F. Wilms. There is a large number of new species, many of them very closely allied to plants already familiar. The naming leaves something to be desired: *e. g.* the specimen (No. 621) sent out as *Cephalaria attenuata* Roem. & Schultes is merely the well-known South African form of *Scabiosa Columbaria;* and the "Ranunculus" (No. 4) is clearly a *Knowltonia*. No. 8773, a *Mesembryanthemum*, is issued with a specific name which is already occupied.

M. Gaston Gautier has just issued a *Flore des Pyrénées-Orientales* (Paris: Klincksieck, 1898). It is a list with full localities of the plants of the region, preceded by an introduction by M. Ch. Flahault and a useful bibliography. There are no descriptions, but we notice certain varieties among the *Hieracia* which appear to be new, although they are unaccompanied by any attempt at diagnosis. The date only appears on the back of the cover, being absent from title-page, preface, or introduction.

We note that the *Bulletin of the Torrey Botanical Club* now appears under new editorship; Dr. Britton has been succeeded as editor-in-chief by Mr. L. M. Underwood. We regret that Mr. C. S. Sargent's admirable periodical *Garden and Forest* has been discontinued owing to lack of support.

The *Standard* of Feb. 2, in a leading article, states that "The late Professor Cardale Babington, of Cambridge, was reported to have experimented more widely in search of edible fungi than most men; but when consulted by one who thought it a pity the resources of Nature should not be more fully utilised, his advice amounted to 'Better let them alone!'" We find no record of this trait of the Professor's character in the recently published *Memorials*.

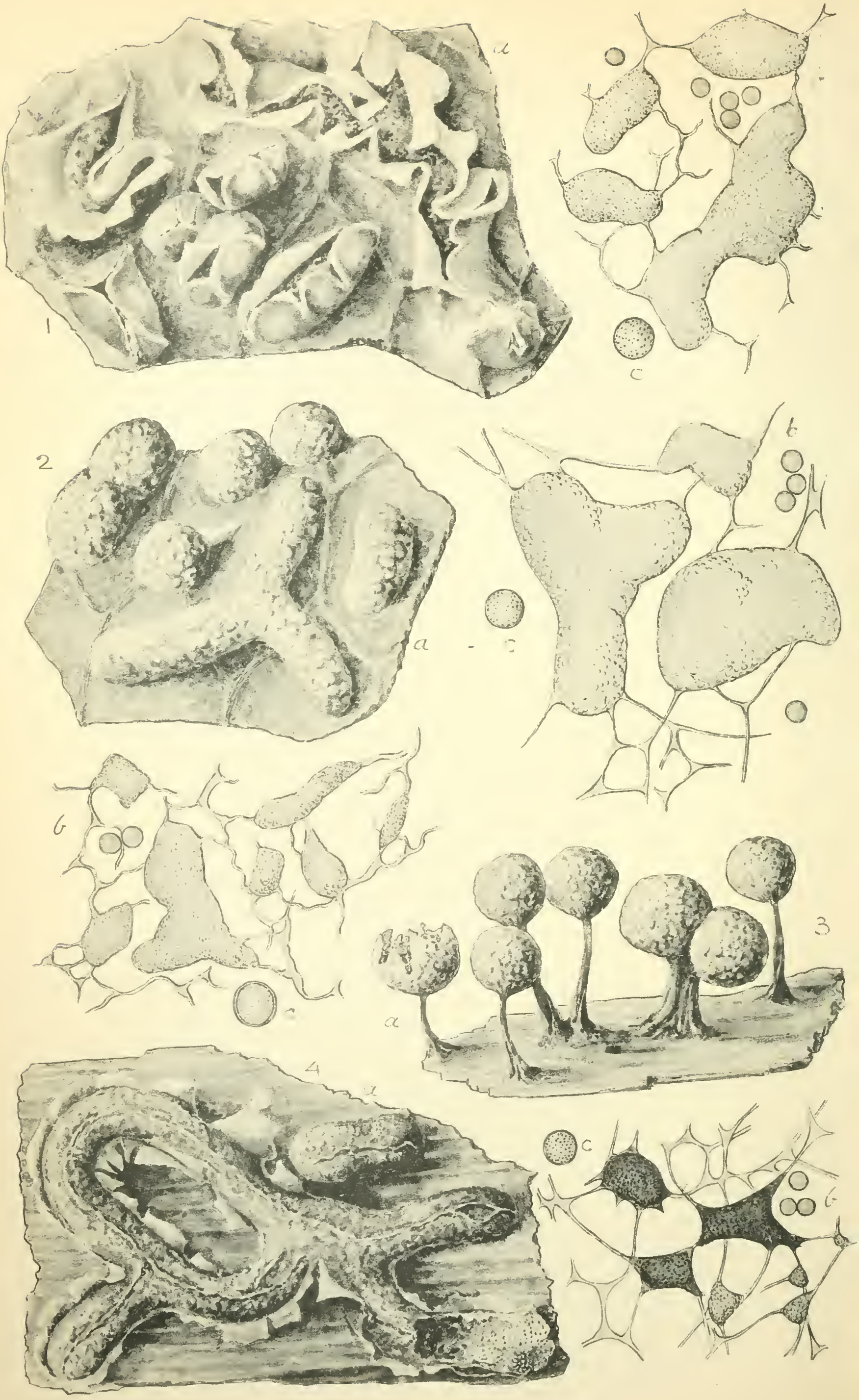
We have omitted to notice the Annual Report (the eighth), issued by the Missouri Botanical Garden, which is no longer marred by the extraneous and irrelevant matter which at one time disfigured these handsome volumes. It is entirely occupied with the botany of the Azores, including a special paper by M. Cardot on the mosses (noticed on p. 415 of this Journal for 1897), and a complete enumeration of the flora—the result of expeditions undertaken in 1894 and 1896 by Prof. Trelease, Mr. C. S. Brown, and of other collections made in the islands. The novelties are few and unimportant, but the large number of plates (sixty-six in all), many of them illustrating endemic and little-known species, give the enumeration a special value.

In *The Naturalist* for February, Mr. J. Larder gives a list of Lincolnshire Mosses, "being part i. of Notes for a future Cryptogamic Flora of Lincolnshire."

British botanists will be glad to know that Lord de Tabley's *Flora of Cheshire* is likely to be published. The MS. copy as left by the author was practically complete, and Mr. Spencer Moore is now looking through it, with a view to seeing the volume through the press.

A handsome and weighty (5 lb. 2½ oz.) volume forms the first instalment of a comprehensive work by Dr. A. T. de Rochebrune, entitled "*Toxicologie Africaine:* étude botanique, historique, ethnographique, chimique, physiologique, thérapeutique, pharmacologique, posologique, &c." (Paris: Doin). It contains 935 pages and 345 figures, many of them reproductions from all kinds of places, and extends from *Ranunculaceæ* to *Rosaceæ*—the Rose alone occupies more than two hundred pages. It is a reprint from the *Bulletin* of the Société d'Histoire Naturelle d'Autun—a fact which we think should have been mentioned somewhere in the work itself. The English extracts require revision. Mr. Bentham is represented as having said of *Hexalobus:* "This African genus is both remarkable: for the transverse undulation and fods, of the petales especially when the bad is near opening; it is probably characteristic of genus" (p. 435).

The "November" number of the Kew *Bulletin* bears the Stationery Office date of October, and was issued in February; the date at the foot of the first page of each number, on which we have been accustomed to rely, cannot therefore be taken as that of actual issue. In the interests of science we once more call upon those responsible to render it possible to ascertain when each number is published. On the present occasion the matter is of no importance, as sixty out of the sixty-four pages are devoted to a reprint of portions of the Report of the West India Royal Commission, issued in the autumn of 1896; so that neither science nor commerce can be said to have suffered from the delay of the "November" *Bulletin*.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G. Lister pinx.

Mycetozoa.

MYCETOZOA OF ANTIGUA AND DOMINICA.

By Arthur Lister, F.L.S.

(Plate 385.)

I am indebted to Mr. William Cran, Principal of Coke College, Antigua, for specimens of Mycetozoa gathered by him in the latter part of 1896 and in 1897 in the island of Antigua, with a small number obtained during a short visit to Dominica. They were sent to me in order that they might be represented in the British Museum Collection, and are interesting as being the first of the kind that have been recorded from Antigua, and almost the first from the West Indies. The species correspond for the most part with those inhabiting the Southern States of North America, including several that are common in this country. Many of the specimens add greatly to our knowledge of forms which have been rarely met with hitherto. Mr. Cran's attention has only recently been called to the group from accidentally meeting with a copy of the little *Guide to the British Mycetozoa* published by the Trustees of the British Museum, and he may be congratulated on securing so much valuable material in the intervals of close professional occupation. The following are the species he has collected, often represented by numerous gatherings:—

1. Ceratiomyxa mucida Schroeter. On rotten wood. The specimens from Antigua are graceful white forms of var. *β flexuosa;* one from Dominica approaches form *α*, and is of a pinkish tinge.

2. Badhamia nitens Berk. On bark. A specimen from Antigua resembles our English form, with the marked exception that the spores are in clusters of four, instead of the usual arrangement of six to ten; they lack the coarse warts on the outer third which are present on most, but not all, British gatherings. Another specimen from Dominica is typical, with spores in rather loose clusters of eight to twelve; as in the Antigua gathering, they are scarcely more warted on one side than the other.

There is a specimen in the British Museum Collection from Ceylon, No. 574, which I had placed in error under *Badhamia decipiens* in the Brit. Mus. Cat. Myc. p. 33, not at first noticing that the spores are in loose clusters of about six, which proves it to be *B. nitens.* It was our only example of this species obtained to my knowledge out of England before we received these from Mr. Cran.

3. Badhamia macrocarpa Rost. On dead wood, Antigua. A small form with slender buff-coloured stalks; spores 11 μ diam.

4. Badhamia panicea Rost. On bark, Dominica. The sporangia are small, in groups of three or four; the capillitium is more typical of the genus than is often found in this species, being entirely devoid of hyaline threads; the spores are large, measuring 14 μ.

5. Physarum variabile Rex. On dead leaves, Antigua. The sporangia are branching plasmodiocarps, or subglobose with here and there an indication of a rudimentary stalk; the colour varies

on different leaves from ochraceous to greenish grey; the lime-knots of the capillitium are pale yellow or nearly white. I place the specimens under the above name, and give a figure (Pl. 385, fig. 2, *a*, *b*, *c*) because they differ from Rex's type in the sessile and paler sporangia; they have also rather smoother spores. Whether these differences amount to a specific distinction appears doubtful, even if further material should show their constancy. Mr. Cran's gatherings at six months' interval present precisely the same characters, and it may be well to mark the form as var. *β sessile.*

6. PHYSARUM MELLEUM Mass. On dead leaves, Antigua. There is considerable variety in Mr. Cran's numerous gatherings of this species. The sporangia are either palish olive-brown or yellow-orange; the stalks are mostly pure white, some are white merging into orange above, and one beautiful growth has dull orange sporangia and yellowish-pink stalks; the columella varies in length; the lime-knots have exceptionally a yellow tinge, but are mixed with others of the usual white colour in the same sporangium.

7. PHYSARUM TENERUM Rex. On bark, Antigua. The general character is typical, with lemon-yellow sporangia and yellow stalks shading to brown at the base; but in some cases the sporangia are nearly white, with darker stalks; the capillitium and spores are alike in all.

8. PHYSARUM COMPACTUM List. On dead leaves, Antigua. The stalks are pure white to the base, similar to the specimen from Dominica in the British Museum Collection (figured Brit. Mus. Cat. Myc., Pl. X. B).

9. PHYSARUM VIRIDE Pers. *a* LUTEUM. On dead wood, Antigua. A fairly typical specimen. The capillitium consists of rather broad and rigid hyaline threads, with orange lime-knots.

10. PHYSARUM BERKELEYI Rost. (Pl. 385, fig. 3, *a*, *b*, *c*). On cocoanut palm leaves, Antigua. Mr. Cran observes that in Antigua all dead exogenous wood is so rapidly excavated by white ants, that little sustenance remains for the growth of Mycetozoa, while palm branches are neglected by the ants, and supply rich ground for collecting. He has sent five gatherings of *Physarum Berkeleyi*, collected at different times; in all of them the sporangia are subglobose, of a bright yellow colour, shading into rufous in the persistent base. Each gathering differs slightly from the others in the length and thickness of the translucent red-brown stalk, and in the number and size of the lime-knots in the capillitium; in some these are small, from 5 to 15 μ diam., in others large and branching, with comparatively few hyaline threads. I have been favoured by Prof. Penzig, of Genoa, with the inspection of six gatherings of this species, made by him in Java in 1896; they correspond with Mr. Cran's in all respects. These eleven examples are interesting as throwing light on specimens which have presented some difficulty. They fall in with a series including the slender type of *P. Berkeleyi* from Dr. Rex, from Philadelphia (figured Brit. Mus. Cat. Myc., Pl. XII. B); *P. oblatum* Macbr. B.M. 107; *P. Maydis* Morgan,

B. M. slide; *P. auriscalpium* Cke. (Brit. Mus. Cat. Myc. p. 61, Pl. xxiii. B, provisionally placed under *P. rubiginosum*); *P. sulphureum* (A. & S.) Sturgis;* *Badhamia citrinella* Cel. fil., kindly furnished me by Dr. Celakovsky; the type of *Badhamia decipiens* in the Strassburg and Kew collections; and with our own gatherings of *P. Berkeleyi* from Witley, Surrey, and Lyme Regis, Dorset. On placing the sixteen camera-lucida drawings of these specimens side by side, they make so complete and graduated a series that it is difficult to draw definite lines and say this belongs to one species and that to another. For practical purposes, however, it is necessary that certain centres should be recognized. In correspondence with Dr. Sturgis he suggests that *Badhamia decipiens* Berk. & Curt. should stand, as at first described by Berkeley, as a sessile form with true *Badhamia* capillitium, and that *Physarum auriscalpium* Cke. should embrace the stalked or sometimes sessile forms with large branching lime-knots; *P. Berkeleyi* Rost. would then include the more slender growths with abundant hyaline threads and small lime-knots. This suggestion appears from the material at our disposal to be a good one, and the three species would be defined as under:—

Badhamia decipiens. Sporangia subglobose or plasmodiocarps, sessile, yellow or orange-yellow; sporangium-wall smooth or rugose; capillitium a coarse network of strands with broad expansions, charged throughout with orange lime-granules; spores violet-brown, equally and minutely spinulose all over, 10–13 μ diam.

Physarum auriscalpium. Sporangia subglobose, sessile or stipitate, varying in colour from orange-red to orange-yellow; sporangium-wall containing clustered deposits of yellow lime-granules, sometimes with a cracked and squamulose outer layer; stalk red-brown or blackish-brown, translucent; capillitium of large branching orange-yellow lime-knots connected by few hyaline threads; spores rather dark violet-brown, minutely spinulose, 9–11 μ diam.

Physarum Berkeleyi. Sporangia globose, hemispherical or subpyriform, stipitate, erect or nodding, yellow or grey with a yellow base, or iridescent from the absence of lime (when it is the form described by Berkeley as *P. flavicomum*); sporangium-wall membranous, smooth or rugose with innate clusters of lime-granules, often thickened and orange-red at the base, or destitute of lime and colourless; stalk slender subulate, or short and stout, red-brown or orange, translucent; capillitium a network of slender hyaline threads with numerous flat expansions at the axils; the lime-knots yellow, angular or branching, but varying in different gatherings with respect to size, shape, and number, as well as in the breadth of the connecting threads; spores pale violet-brown, very minutely spinulose, 7–9 μ diam.

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* Dr. Sturgis, of the Agric. Exp. Station, New Haven, Conn., U.S.A., has kindly sent me a specimen of the species he has described and figured as *Physarum sulphureum* Alb. & Schw. (Bot. Gazette, xviii. 187). In a former letter to me he says: "there can be little doubt that it is identical with the scanty specimen under that name in the Schweinitz Collection, and it is fair to presume that Schweinitz had sufficient grounds for considering his American specimen to be identical with that found in Europe." The original description of the stalk of the European type of *P. sulphureum* is as follows:—"Stipes e basi crassâ in formam exacte conicam attenuatus, albus" (Albertini and Schweinitz, *Conspectus Fungorum*, p. 93, publ. 1805). This description is inapplicable to any member of the group we are dealing with, in which the stalk, when present, is translucent, and orange or red-brown; the term "albus" implies that the conical stalk was charged with lime, as in *P. melleum* Mass. Comparison shows that Dr. Sturgis's *P. sulphureum* is the same species as *P. auriscalpium* Cke., and, considering the uncertainty that attaches to the former name, he now proposes that *P. auriscalpium* Cke. should stand as representing this American form.

I here interpose a reference to a species that is included under *Badhamia decipiens* in the Brit. Mus. Cat. Myc. p. 33, which must be separated from the group we have been considering; the figures there given, Pl. iii. B, a, b, c, were drawn from a specimen from Fairmount Park, Philadelphia, sent me by the late Dr. Rex as identical with one in the Schweinitz Collection under the name of *Physarum reticulatum* A. & S. (syn. *Cienkowskia reticulatum* Rost., an erroneous naming by Schweinitz which has led to a misunderstanding in America of the true character of *Cienkowskia*). Since the publication of the British Museum Catalogue, evidence has now come to hand which proves the specific distinction between this and *B. decipiens*. In the specimens I have seen the spores differ from those of that species in being more distinctly warted on one side than the other, the capillitium is paler in colour, and often more truly that of a *Physarum*; in these observations I am confirmed by Dr. Sturgis. The species is referred by Mr. Massee to *Physarum gyrosum* Rost. (Mass. *Monograph Myxogastres*, p. 307); unfortunately the type-specimen under that name in the Strassburg Herbarium is a form of *Fuligo septica*. The name *P. gyrosum* could not therefore be adopted for the American species; but it has been well described by Mr. Morgan under the name of *Physarum Serpula*, n. sp. in "Myxomycetes of the Miami Valley, Ohio" (Journ. of Cincinnati Soc. Nat. Hist. Aug. 1896, p. 101), so that at length it has obtained a definite position.

11. PHYSARUM NUTANS Pers. var. γ LEUCOPHÆUM. On dead wood, Antigua. A very limited specimen. The dark stalk extends into the sporangium as a conical columella, from which radiate the scanty hyaline threads of the capillitium; these are sparingly branched, and have broad flat expansions at the axils; the lime-knots are long, narrow, and forked; the spores are pale violet, 8 μ diam. A conical dark columella is not uncommon in robust British specimens of var. γ; but the capillitium of this from Antigua is different from that met with in any of our English gatherings. It is interesting to compare the Antiguan example with eight specimens of *P. nutans* collected by Prof. Penzig in Java; there are six in which the capillitium resembles that from Mr. Cran, having branching lime-knots sometimes running into a *Badhamia*-like network, but much more profuse than in the Antigua form; the stalks are long and slender, pure white, filled with refuse matter at the base, or dark below and pale above. One of the eight specimens is typical *P. nutans* var. β, and another has an intermediate position between var. β and γ. None of the Java sporangia have a columella. Although these Antigua and Java forms are striking, there appears to be no specific character to separate them from *P. nutans*.

12. **Physarum calidris** List. On fibrous tissue (palm leaves?), Antigua. There are four gatherings of this species. The sporangia are either smooth or rugose on red stalks; they show variation in the capillitium from the *Badhamia* to the *Physarum* type such as are met with in England.

13. **Physarum compressum** Alb. & Schw. On dead leaves and sticks, Antigua. Two gatherings of the typical form, with compressed simple or lobed sporangia on grey stalks.

14. **Physarum pallidum** List. (syn. *Diderma pallidum* Berk. & Curt.) (Pl. 385, fig. 1, *a*, *b*, *c*). On leaves, Antigua. Mr. Cran has sent five gatherings of this species. The sporangia vary in colour from reddish brown to buff, bright yellow or nearly white; they are sessile on a narrow elongated base, either ovoid and somewhat angular, or flexuose terete plasmodiocarps; the outer sporangium-wall is smooth, and densely charged with white lime on the inner side; it is usually areolated more or less closely with pale lines, and along these lines it breaks and separates in reflexed lobes from the persistent membranous inner wall; the capillitium consists of numerous white lime-knots connected by slender hyaline threads; the spores are 8 μ diam., nearly smooth, pale violet-brown, resembling those of *P. nutans*. The species is represented in the Kew Collection by a specimen from South Carolina marked *Diderma pallidum* Berk. & Curt. No. 1972, and in the British Museum Collection by one from Ravenel under the same name; there are other specimens also in the British Museum from South Carolina, Georgia, and Brisbane, marked "*Physarum*," "*Didymium Serpula*," and "*Angiordium valvatum*." *Diderma pallidum* is mentioned by Berkeley in *Grevillea*, ii. 52, under "Notices of North American Fungi," and reference is made to the specimen No. 1972, but he does not describe it, and no previous record of the name can be traced. Although it is undoubtedly a distinct species, Rostafinski gave *Diderma pallidum* as a synonym for *Physarum bivalve*, one of its nearest allies; from the crushed state of the herbarium specimens he would have had difficulty in making out the general characters, and the difference of the paler and smoother spores seems to have escaped his notice, as it did my own on the first examination of these specimens. There are specimens of *P. bivalve* from South Carolina in the British Museum, but Mr. Cran has not yet met with this species in Antigua. Prof. Penzig has collected both *P. bivalve* and *P. pallidum* in Java.

15. **Physarum murinum** List. var. β **æneum**, n. var. (Pl. 385, fig. 4, *a*, *b*, *c*). On palm-leaf, Dominica. The single gathering consists of a few ellipsoid sporangia, and a number of branching or anastomosing plasmodiocarps. The species has hitherto been only obtained from Scotland, Sweden, and the United States; and the Dominica specimen differs from all previous examples in several particulars. The general colour under a pocket-lens is dull bronze as compared with the usual pinkish brown; the sporangium-wall is of two layers, contrasting with the single wall of former specimens; the outer layer separates and folds back from the inner, especially in the

lower half, while remaining connected above; it is semicartilaginous in substance, of a yellow-olive colour, and mottled with deposits of brownish lime-granules; the inner layer is membranous; where the spores and upper part of the wall have fallen away, the interior of the sporangium, as seen as an opaque object, shines like brass with iridescent reflections; it is dotted over with pale papillæ, which in some cases may be points of attachment to the capillitium. These striking differences from the type of *P. murinum* might constitute a specific distinction, if further gatherings should confirm their constancy. The capillitium, however, with its brown lime-knots and pale violet-brown spores, are essentially typical of the species. The spores are small, measuring 7 μ, but they correspond with those of a stalked form of *P. murinum* sent me by Mr. Robert Fries from near Upsala, in October, 1897. Until we have further information, I propose to mark the Dominica specimen as *Physarum murinum* var. *æneum.*

16. Physarum cinereum Pers. Five specimens on bark and herbaceous stems, Antigua. They are the English form with pale spores.

17. Physarum conglomeratum Rost. On dried leaf, Antigua. The sporangia are browner, more irregular in shape, and more scattered than usual; the vitreous structure of the sporangium-wall, though present, is also less pronounced; the spores, measuring 7–8 μ, are more spinulose than in typical examples. It is an uncommon form, but in shape it resembles a gathering from Lyme Regis.

18. Fuligo septica Gmel. Antigua. A typical yellow æthalium.

19. Fuligo ellipsospora List. On rind of papaw tree, Antigua. The specimen consists of two small æthalia with characteristic spores.

20. Physarella mirabilis Peck. On withered frond of cocoanut palm, Antigua. Two specimens; one quite typical, the other with thick and irregular stalks.

21. Craterium leucocephalum Ditm. On dead leaves, Antigua. The sporangia are mottled red and white in the upper two-thirds, and have rather long red-orange stalks.

22. Chondrioderma spumarioides Rost. On bark, Antigua. A single good gathering. The sporangium-wall is cracked in areolæ, and the inner layer adheres closely to the outer. It varies slightly from the type in the very prominent white columella, and in the spores, which measure 10 μ, being rather darker and more spinulose.

23. Chondrioderma Michelii Rost. On dead leaves, Antigua. Two fine typical gatherings.

24. Chondrioderma rugosum Rex. On dead leaves, Dominica. This gathering is interesting as being the only one we are acquainted with, except the type obtained and named by the late Dr. Rex from North Carolina. The stalks are black, the clavate columella is white, with a narrow pale tawny base; the substance of the sporangium-wall and the slender capillitium are the same as in

Rex's gathering, from which the Dominica specimen differs in the size of the spores, that measure 14 μ as opposed to 9 μ.

25. Diachæa elegans Fr. On dead leaves, Antigua. The two gatherings of this species have the white stalks longer than the cylindrical sporangia, and almost smooth spores; a typical form.

26. Didymium effusum Link. On dead leaves, &c., Antigua. There are three large gatherings of this species, which Mr. Cran says is most abundant in the island. The sporangia are subglobose and stalked, and the capillitium varies from almost black to colourless, as it does in European specimens.

27. Didymium Clavus Rost. On dead leaves, Antigua. A single typical specimem with short dark stalks.

28. Didymium nigripes Fr. γ xanthopus. On dead leaves, Antigua. A single gathering. The stalks are dark brown, shading upwards into dull orange; the columella and capillitium colourless; the spores are pale and measure 7 μ, which is small for the species. In comparing a series of English gatherings of var. *xanthopus* a great difference is observed in the depth of the colour of the spores; specimens with dark and with pale spores are in about equal proportion.

29. Stemonitis fusca Roth. On dead wood, &c., Antigua. There are several gatherings of this species. The spores are closely reticulated in all, and vary in size from 7 to 10 μ diam.

30. Stemonitis splendens Rost. On dead wood, Antigua. In one gathering the superficial net of the capillitium has the small mesh of Rostafinski's type from Texas, in another the mesh is broader; the spores measure 6–7 μ diam.

31. Stemonitis herbatica Peck. There are two gatherings from Antigua, one on palm-leaf and the other on "decayed stumps of sandbox trees," and one from Dominica. The superficial net of the capillitium is similar to that of Peck's type; the spores are greyish, 6–7 μ diam.

32. Stemonitis Smithii Macbr. On wood, Antigua. The six gatherings of this species differ from the usual type in the delicate surface net of the capillitium having a wider mesh; the spores measure 5–5·5 μ.

33. Comatricha Persoonii Rost. On wood, Antigua. There are three gatherings. They are all of a small form with rather clavate sporangia of a pinkish colour, and take an intermediate position between the type and var. β *tenerrima;* the spores are nearly smooth, 6–7 μ diam.

34. Comatricha typhoides Rost. On dead wood, Antigua. A typical form with dense intermediate capillitium; the spores measure 5–6·5 μ, and have the widely scattered warts remarked on by Dr. Rex as characteristic of the species.

35. Comatricha longa Peck. On a slip of wood, Antigua. The specimen is in perfect condition. Mr. Cran writes: "I found it on a root hanging down like a goat's beard; some of the sporangia must have been almost or quite two inches in length."

36. Lamproderma arcyrionema Rost. On decayed leaves of cocoanut palm, Antigua. Two gatherings with stalks 1·8 mm. long; the capillitium is dark and much crisped. "It was quite lustrous," Mr. Cran writes, "when first seen, though almost black with perhaps a slightly yellowish tinge; under the microscope the enclosing membrane looked like polished silver."

37. Lamproderma irideum Mass. On dead leaves, Antigua. Two very typical specimens, though the dark branches of the capillitium are less pale than usual at their point of attachment to the apex of the columella; the spores measure 7 μ, and are marked with the normal number of about eight warts across the hemisphere.

38. Cribraria tenella Schrad. There are two specimens from Antigua on dead wood, and one from Dominica. In all, the sporangium-net is regular, with scarcely the rudiments of a cup; the nodes of the net are round, seldom triangular, and without free rays.

39. Cribraria languescens Rex. Antigua. "The plasmodium is dark reddish-brown, rising out of rotten wood in little cushions, as in *Dictydium umbilicatum*." We have three fine gatherings of this graceful species, which Mr. Cran finds is abundant in the island. They are similar to the types from Dr. Rex. Judging from the examples we have seen, its character appears to be, for a *Cribraria*, remarkably constant. We have no record of the species having before been obtained, except from three of the States of North America.

40. Cribraria violacea Rex. There are two gatherings on dead wood from Antigua of this delicate and beautiful species. The sporangia measure 0·01 mm. diam. I may mention that a fragment of ash-stick was sent by me from Lyme Regis to Miss A. L. Smith at the British Museum for the examination of a small fungus growing on it. The stick was kept moist under a glass shade for some weeks, when a fine growth of *Cribraria violacea* was found to have developed; the sporangia are larger than those from Antigua, measuring 0·025 mm., but similar to those collected by Mr. Saunders in Buckinghamshire and by Dr. Rex from near Philadelphia.

41. Dictydium umbilicatum Schrad. On dead wood, Antigua. This is the common form received from all parts of the world, and always singularly constant in character. The brown variety with a symmetrical cup (referred to in the Brit. Mus. Cat. Myc. p. 148), though less frequent, is also cosmopolitan, and is so little subject to variation that it deserves a varietal, if not a specific, distinction. I mark it as var. *fuscum*.

42. Tubulina stipitata Rost. On dead wood, Antigua. A single specimen of three shortly stipitate clusters. The spores measure 4 μ diam.

43. Hemitrichia clavata Rost. Two gatherings from Antigua on dead wood. The sporangia are of the usual form and colour; the spores are exceptionally small, measuring 6 μ in one specimen, and 7 μ in the other.

44. Hemitrichia Serpula Rost, On dead wood, Antigua. The gatherings received of this species are interesting as illustrating the

variation that occurs in the spinose character of the capillitium, and also as showing the close connection that exists between the two genera *Trichia* and *Hemitrichia*. In one specimen the capillitium is strongly spinose, in another good development the threads are almost smooth, and although the *Hemitrichia* structure prevails, there are many free elaters of various lengths, some of them very short; in this respect it corresponds with a specimen of *H. Serpula* from New Zealand, referred to in the introduction to the Brit. Mus. Cat. Mycetozoa, p. 16.

45. Hemitrichia rubiformis List. On bark, Antigua. A typical specimen.

46. Arcyria albida Pers. On dead wood, Antigua. This variable species is well represented in Mr. Cran's gatherings. Some of the sporangia are ovoid, some cylindrical, and either solitary or in clusters of three or four on a combined stalk; the colour varies from grey to buff and orange-yellow. The last might rank as var. *pomiformis*, but the sporangia are shortly cylindrical. The capillitium is more or less spinose in different gatherings, but it is of precisely the same character in some of both the grey and orange-yellow sporangia.

47. Arcyria punicea Pers. This species is represented by five gatherings from Antigua, and one from Dominica. In the Dominica specimen and in two of those from Antigua the capillitium is of the usual English type; in the others the threads are extremely slender, beset with sharp and rather distant spines—a form that has been collected before in hot climates.

48. Arcyria incarnata Pers. On dead wood, Antigua. An interesting slender form of the species; the capillitium is unattached to the smooth, delicately membranous cup, and has numerous clavate free ends.

49. Arcyria insignis Cke. & Kalchb. On dead wood, Antigua. Mr. Cran has sent five gatherings of this minute form. The sporangia are in small scattered clusters, pale rosy red, and inconspicuous from the slender capillitium spreading widely. Until recently the two specimens from the Cape in the Kew Herbarium were the only known examples of the species. In December, 1896, I received from Dr. Nyman, of Upsala, a fine specimen of a larger form than those referred to; the unexpanded sporangia are cylindric, measuring 1–1·3 mm. in total height, of which the stalks are 0·3–0·5 mm.; it was obtained at St. Angelo, Brazil, by G. Malmé, in January, 1893; though differing in the size of the sporangia, the character of the capillitium is precisely the same as in the Cape and Antigua gatherings. Among the Java specimens collected by Prof. Penzig there is one of *A. insignis* of the same form as the type in the Kew Herbarium; it consists of six clusters of sporangia with expanded capillitium, on dead wood. With the exception of the Brazil specimen, none of the recorded examples retain their original form. It is satisfactory that the integrity of the species is now well established.

50. Perichæna chrysosperma List. On dead wood, Antigua. The five specimens of this species present the variation in the length of

the spines on the capillitium observed in our English gatherings; in some the spines are scattered and longer than the diameter of the thread, in others they are minute and unusually crowded.

51. Perichæna variabilis Rost. On dead wood, Antigua. Fine specimens of winding and anastomosing plasmodiocarps, which vary in colour from brown to olive-ochraceous; the characteristic papillose inner wall is well marked.

52. Perichæna depressa Libert. Mr. Cran writes: "On fallen bark, often on the inner side and seeming to love the dark"; Antigua. There are four handsome gatherings, showing great diversity of colour in the sporangia; in one they are pale ochre, with the outer wall strongly charged with crystalline deposits of lime; the others vary from dull rosy red to deep purple-brown; the profuse capillitium in the pale and red sporangia is remarkably firm and even in thickness; that of the purple-brown sporangia is of the usual irregular and weak type; the spores measure 9 μ.

53. Lycogala miniatum Pers. On dead wood, Antigua. The æthalia are small, with thin but characteristic cortex.

Explanation of Plate 385.—1. *Physarum pallidum* List. 2. *Physarum variabile* Rex, β *sessile*. 3. *Physarum Berkeleyi* Rost. 4. *Physarum murinum* List. β *æneum*. *a*. Sporangia × 20. *b*. Capillitium and spores × 280. *c*. Spore × 600.

Note.—Since the foregoing went to press, I find that Dr. Raciborski has published in *Hedwigia*, xxxvii. 1898, pp. 50–55, an account of the Mycetozoa he had collected in Java in 1896–7. Among the species he enumerates is *Physarum bogoriense* Racib., n. sp., the description of which so accurately applies to the specimens of *P. pallidum* received from Mr. Cran, that I cannot doubt it is the same species; in which case *P. bogoriense* must take precedence as its first published name under *Physarum*.

EXPERIMENTS IN CROSS-FERTILISATION OF SALICES.

By Edward F. Linton, M.A.

It not unfrequently happens that a suspected willow-hybrid has to be left in interminable doubt as to its origin, for want of convincing evidence. Such is the case of *S. decipiens* Hoffm. and *S. acuminata* Sm.; they were described long ago; their origin has been speculated on and guessed at, with no definite result; but if either of these could be reproduced through cross-fertilisation by hand, a puzzling question would be settled.

It occurred to me some years ago to make experiments among the willows growing in my garden, in the hope of obtaining hybrids about whose origin there could be no doubt. This was not so easy a matter as it seemed; the process is liable to all sorts of miscarriages; failures have been far more numerous than successes;

still, in the course of the last five or six years, the Rev. Wm. R. Linton at Shirley and myself at Bournemouth have been able to produce a fair number of satisfactory hybrids; and we are issuing some of the most interesting products in our Set of British Salices.

For instance, *S. viminalis* L. (♀) was fertilised with pollen of *S. repens* L., and in due time a good growth of seedlings was established, some male, some female. All the sowing came true, and the plants retained in the garden are all fairly intermediate; but there is great variety of expression, and the eye can easily detect differences in most of the individuals of the crop. None of the plants resemble the *S. repens* variety *rosmarinifolia*, E. B. tab. 1366, reproduced by Syme to represent what he calls *S. rosmarinifolia* var. *angustifolia* Wulf.; but some agree pretty nearly with E. B. tab. 1365 (*S. rosmarinifolia* "Linn." Boswell-Syme) which Wimmer detected as representing *S. viminalis—repens*.

An apparent failure has occasionally been converted by accident into a fortunate mistake, as when *S. Myrsinites* was fertilized with *S. Arbuscula* pollen, and a genuine undoubted example of *S. Myrsinites* × *phylicifolia* came out!* Two or three such cases have occurred, in which a much-desired hybrid was produced unintentionally. This intermediate plant of *S. Myrsinites* × *phylicifolia* (♀) has been of the greatest service, not only in supplying excellent material for the Set, but in exposing the claims of one or two pretenders.

Of another hybrid supposed to be British, viz. *S. Lapponum* × *repens*, the only published plant has lately been withdrawn. Whether it is a British hybrid, or not, authentic plants have been growing at Bournemouth, made by design, and have served for the issue of specimens which may at any time prove very useful for comparison.

Besides the production of some hybrids which are known to occur in nature, the Rev. W. R. Linton and myself have experimented in the direction of the probable, but not as yet recorded: and have found that some of these resist all our efforts so far, while some others have been made without difficulty. Three of these, which have been developed successfully, and which might be discovered in a limited range of country among the mountainous districts of Scotland, have been thought worthy of issue in the Set of British Salices, and a short account of each of them is subjoined.

S. CAPREA × LANATA, nov. hybr. Set of British Willows (1894, &c.), No. 88. Habit low, spreading or ascending; leaves subentire, large, roundish ovate, very shortly acuminate, green above, glaucous grey below, very silky at first, then pl. m. glabrescent reticulate; stipules large, usually present, very obliquely pointed or rounded. Catkins large, handsome, resembling *S. lanata*; scales oblong-obovate to oblong-lanceolate, densely clothed with long silky hairs; nectaries square or oblong. *S. Caprea* L. has been seen on Meall nan Tarmachan, Mid-Perth, at the *S. lanata* elevation, and also is abundant at the mouth of the Doll, near Clova, Forfar, not far below the *S. lanata* level. The occurrence of the hybrid may therefore be looked for. At one time I regarded a foliage specimen of *S. lanata* in the Borrer Herbarium, Kew, as this hybrid; it was labelled "Ex hb. J. H. Balfour 5 Salix ——. Glen Isla, Aug. 1837." A note is added by Borrer, "5 Why not *S. lanata*?" A later hand has added, "Probably *S. Caprea* by its stipules, 1847." The specimen certainly has a look of both; but, judged by aid of my own authentic specimens, it must be relegated to *S. lanata* L.

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* The pollen of *S. Arbuscula* does not take at all readily. In this case of course the female *S. Myrsinites* catkin had been pre-fertilised with *S. phylicifolia* pollen, probably by bees, which are very busy among the willow flowers.

S. CINEREA × MYRSINITES, nov. hybr. Set of British Willows, No. 92. Habit ascending; bark very dark, blackish brown; buds dark brown, pubescent; l. oblong or ovate-oblong, dull glaucous green beneath, green and shining above, crenate or crenate-serrate; stipules broadly rounded below, $\frac{1}{2}$-cordate, acuminate, subpersistent; catkins intermediate in size; anthers reddish yellow. In the north parts of Scotland, where *S. Myrsinites* L. descends to a low level, this hybrid may well be looked for. As a young bush, my plant has as yet the habit of *S. Myrsinites*, to which parent the gloss of the upper side of the leaves, the point and persistence of the stipules, the colour of the buds and bark, and the reddish anthers are due. *S. cinerea* (the male parent) comes out in the larger broad-based stipules, and the larger leaves with their glaucous colouring beneath.

S. LANATA × REPENS, nov. hybr. Set of British Willows, No. 99, made at Bournemouth; also No. 100, made at Shirley, S. Derby. Ascending, bark dark after the first season; leaves oval-oblong or oblong-lanceolate, entire or faintly crenate, silky at first, but pl. m. glabrescent; stipules rather small, lanceolate; catkins large, fairly intermediate, scales oblong-obovate, very silky, discoloured; ovaries glabrous, shortly pedicelled; nectaries much shorter than pedicels; style long. The bushes on which this description is founded are both female, and were made by fertilising *S. repens* with pollen of *S. lanata*.

Since *S. herbacea* × *repens* has been ascertained to be one of our British hybrids (Journ. Bot. 1897, 362), there is no antecedent impossibility that would prevent the union in a native station of *S. lanata* and *S. repens*; though the very local range of the former renders the discovery of the hybrid improbable. Such a hybrid might, however, be very easily passed over or laid on one side as doubtful, for in our plants there is little resemblance to either parent; and, if found wild, they would prove a hard knot for any salicologist to untie.

Some interesting observations have been made in the course of these investigations, and one of them may be fitly introduced here. As was said above, some combinations have so far resisted our efforts; in some cases these attempts have been made in vain. Thus, though in theory every willow is supposed to be capable of crossing with each of the other species, experiment seems to show that some cross with greater readiness, others with reluctance, and others again obstinately refuse to enter into any alliance at all. And this throws a little light (not much!) on the extreme rarity of a likely hybrid such as *S. Caprea* × *cinerea*, and the entire absence of some others which are looked for and not found.

A NOTE ON FRAGARIA.

By James Britten, F.L.S.

The treatment which Mr. Druce in his *Flora of Berkshire* (pp. 189, 190) metes out to our British Strawberries seems to me so likely to involve a hitherto sufficiently simple genus in confusion, and to introduce new and untenable names into our nomenclature, that I propose to deal with it at greater length than was possible in the review of his book (pp. 104–9). My remarks will incidentally show the light-heartedness with which accepted nomenclature is sometimes overturned, and the slender grounds on which new species are launched into being—even by those who, like Mr. Druce, spare neither time nor industry in the pursuit of botanical investigation.

Fragaria bercheriensis.

Under this name Mr. Druce proposes an addition to the known species of *Fragaria*. It is true that he expresses many doubts as to the position of the plant, but he gives it specific rank in the text of his *Flora*. It may be well to consider its claims to this position, and this I am the better able to do as the Rev. W. R. Linton has kindly lent me excellent specimens collected and authenticated by Mr. Druce.

I propose in the first place to quote Mr. Druce's account of the plant, omitting the localities, and then to comment upon this and upon the specimens. The former runs thus :—

" F. bercheriensis, Druce, in Rep. Bot. Exch. Club (1894). 446. ? *F. vesca* × *chiloensis*.—The plant has the large leaves with the open teeth and papyraceous texture of *F. chiloensis*, but the flowers and fruit are not larger than in normal *F. vesca*. The hairs on the stem are reflexed. Typical *F. vesca* grows in the ditches in the vicinity. The facies of the plant is fairly well represented in the plate of *F. dumetorum*, Jord., in Jordan and Fourreau's *Icones* (t. xxvi.) *ad Floræ Europæ*, but *F. dumetorum* belongs to the group of *F. collina*, which has an erect calyx appressed to the succulent receptacle ; in *F. bercheriensis* they are reflexed as in *F. vesca*, from which it is distinguished by its much larger leaves of a more papyraceous texture, with more open teeth, the upper surface of a darker green, the lower whitish in tint with very prominent leaf-veins ; the calyx somewhat resembles *chiloensis*. From *F. chiloensis* it may be distinguished by its much smaller flowers and fruits. In the shade form of *F. vesca*, illustrated by the var. *sylvatica* in *Herb. Fl. Ingricæ*, the plant is not so large nor are the leaves so markedly light in colour on the under surface, and the leaf cutting is more acute and the teeth closer together. The fact of its fruiting freely is not an absolute proof of its not being of hybrid origin.

" Specimens were distributed through the *Bot. Exch. Club* in 1894 ; the editor, the Rev. W. R. Linton, reports that he has seen just the same plant in Norfolk and near Godalming in Surrey. Possibly our plant may be only an extreme form of *F. vesca*. Comparative cultivation is needed before we can decide definitely if the plant I have provisionally called *F. bercheriensis* be of hybrid origin or a variety of *F. vesca*, or a subspecies bearing the same relation to *F. vesca* as *F. dumetorum* does to *F. collina*. Probably this plant is occasionally reported as *F. elatior*."

It will be observed that no less than five views are suggested as to the plant, which first appeared in print in 1895. It stands first as a species, then as a doubtful hybrid, then as possibly an extreme form of *F. vesca*, then as a possible variety of that species, and lastly as a possible subspecies. When Mr. Druce sent it to the Exchange Club, with a note which is embodied in the above extract,* Mr. W. R. Linton remarked "Cultivation alongside of type *vesca* would show if it possesses features justifying its taking position as a variety or species"; Mr. Druce has adopted this suggestion, but seems to have taken no steps to carry it out.

It is difficult to see any justification for publishing the plant as a species, even if we ignore the specimens and base our conclusions upon Mr. Druce's account of it. He does not tell us that he has compared it with the series of specimens to be found in our public or private herbaria, notably with the very interesting series of forms from Duchesne in the Linnean Herbarium. There is no diagnosis of the plant beyond such as can be deduced from certain comparative and vague statements; and when we look into these, they come to very little. Mr. Druce says it has the "facies" of *dumetorum*, but, he adds, "*F. dumetorum* belongs to the group of *F. collina*," whereas his plant clearly goes with *vesca* in the important character afforded by the calyx; he might also have noted that the size of the flowers in no way suggests any *collina* form. "The calyx somewhat resembles *F. chiloensis*"; Mr. E. G. Baker, who has examined the plants with me, agrees in finding no such resemblance, nor can we see in what respect the calyx differs from that of typical *vesca*. The leaves certainly are large—one of them is larger than any *vesca* we have seen; but we cannot see that they differ in colour, in toothing, or in texture, from numerous examples of *vesca*; and the locality—"a ditch bordering a plantation" (Bot. Exch. Club Report, p. 445)—seems sufficient to us to account for the unusual luxuriance of the specimens in all respects. Mr. Druce says "it may be distinguished from *F. chiloensis* by its much smaller flowers and fruits"; it would be simpler to say that the flowers and fruits are those of typical *vesca*, for we cannot see the faintest suggestion of *chiloensis* in anything except the size of one or two of the leaves. Nor can we agree with Mr. Druce in suspecting that the plant "is occasionally reported as *F. elatior*"; the small flowers would prevent any such confusion. Mr. Linton's statement that he "has seen just the same plant elsewhere" must not be understood as supporting Mr. Druce in considering the plant specifically distinct. There can be little doubt that the plant is a luxuriant form of the common wild strawberry, due to its place of growth, and quite unworthy of varietal, to say nothing of specific distinction.

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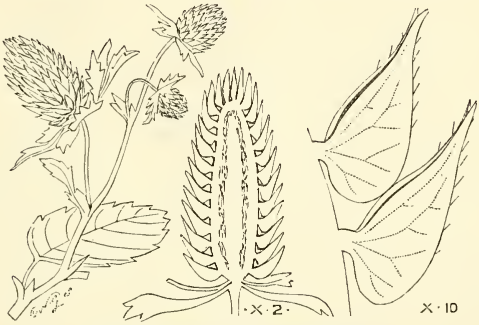
* He then (*l. c.* 446) also drew attention to "the long coarser runners" as different from any he had seen in *F. vesca*, but Mr. Linton in his note disposed of this character, which is not now included in the description.

Mr. Druce's next species stands thus :—

"FRAGARIA MURICATA, Linn. Sp. Pl. 495 (1753). Mill. Gard. Dict. ed. 8 (1768). The Hautboy Strawberry.

"*F. moschata et dioica*, Duchesne, Hist. Nat. Frais. 145 (1766). *F. magna*, Thuill. Fl. Par. ed. 2, 254 [1799]. *F. elatior*, Ehrh. Beitr. vii. 23 (1792)."

There never has been any serious doubt as to what plant Linnæus had in view when he printed the name *muricata*. Indeed, although I do not claim to have exhausted the literature, the only expression of uncertainty I have come across is that in the *Index Kewensis*, where the name stands "*muricata* Linn. Sp. Pl. 495 = elatior, vesca." It is a plant with a history, of which an interesting summary is given in the *Gardeners' Chronicle* for 1887 (vol. ii. 164).*



THE PLYMOUTH STRAWBERRY.

It was first found by Tradescant in a garden at Plymouth, whence it became known as "the Plymouth Strawberry" (see Johnson in Gerard's *Herball*, 998 (1633)). About this time it seems to have been well known in England; Parkinson (*Paradisus*, 527–8 (1629)) figures and describes it, and Merrett (*Pinax*, 39 (1666)) records it from "Hidepark and Hampsted woods." Zanoni (*Istoria Botanica*, p. 95, t. 38 (1675)) figures and describes it as "Fragaria Arborea con fiore herbaceo"; in the later edition of this work (1742) the plate is reprinted (t. 78), and in the description (p. 115) the names from Ger. emac. and Park. *Parad.* are cited as synonyms.

It was on Zanoni's figure and description and on the description in Morison's *Historia* (ii. 186: "Fragaria major vesca flore herbaceo") that Linnæus based his *F. muricata*; and as Morison cites Zanoni, we are absolutely clear as to the plant intended by all three. No one has ever for a moment supposed that this was anything but a monstrosity of *F. vesca*, and it is here that it is placed, with the above and much more synonymy, by Duchesne in his admirable *Histoire des Fraisiers* (1766).

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* The paper is accompanied by a cut, which the courtesy of the proprietors enables me to reproduce.

This sufficiently disposes of Mr. Druce's attempt to replace *F. elatior* Ehrhart by *F. muricata* L. But there is ample evidence to show that, even apart from this, Linnæus himself regarded his *muricata* as an obscure plant. In the second edition of the *Species Plantarum* (p. 709) the descriptive phrase runs: "Fragaria caule erecto suffruticoso, foliis hirsutis. †." This mark he thus explains in the preface: "si aliquando contigerit non sufficienter inspexisse plantam, vel specimen imperfectum obtinuisse, signo † hoc notavi, ut alii eandem accuratius examinent." Duchesne (*l. c.* 106) gives in a footnote the following extract from a letter which he had received from Linnæus: "*Fragariæ muricatæ* tantum miserrimum specimen vidi in Herbario amici; cum vero ejus sufficientes notas nullo modo eruere poteram, hujus memini in Speciebus signo † adposito, quod indicat me non rite vidisse plantam; sed eam allegasse ut alii incitarentur in ejus examen et descriptionem."

A note on "the Plymouth Strawberry" may be added in passing. When Duchesne wrote in 1766, he said "il paroît ne pas avoir aujourd'hui d'existence," and he owed his knowledge of it to a fragment of a dried specimen sent him from Bologna. The writer in the *Gardeners' Chronicle* considered the last reference to its actual occurrence in cultivation, prior to its rediscovery in 1887 in the Edinburgh Botanic Garden (where it had been known for some years), to be that in Ray's *Historia Plantarum*, i. 609 (1686)—"Cantabrigiæ in horto per aliquot annos colui." But in the Banksian Herbarium there is a specimen which shows that the plant existed in at least one garden in the eighteenth century. This was sent to Jacquin (who transmitted it to Banks) by Marsili, who was long in charge of the garden at Padua; it bears the following note in Marsili's hand: "Fragaria muricata, Duchesne, Hist. des Frais. Mr. du-Chesne dans son histoire naturelle des Fraisiers, à Paris, 1766, 8°, se plaint que cette espèce de Fraisier se soit perdue dans touts les Jardins d'Europe; mais elle s'est heuresement [*sic*] preservée par mes soins dans celui de Padouë." This must have been written towards the end of the century. The fruiting specimen is a very good one, and shows the frilled calyx, "like unto a double ruffe" and the "many small harmlesse prickles" on the fruit, which Parkinson describes.

To return to Mr. Druce's synonymy, it will be observed that he adds to *F. muricata* a reference to Mill. Gard. Dict. ed. 8 (1768). It is evident at a glance that Miller's plant and Linnæus's are not identical, for Miller cites as a synonym of his *muricata*, "Fragaria fructu parvi pruni magnitudine"—a phrase which Linnæus had cited under his "var. *sativa*" of *F. vesca*, and which Ehrhart himself cites, as he does also Miller's name, as representing his *elatior*.

I cannot suggest what Mr. Druce intended by his reference to "*F. moschata et dioica* Duchesne, p. 145." I find no such combination on the page quoted or elsewhere, nor is the name *dioica* included in Duchesne's list of his plants.

Although Linnæus's *muricata* cannot replace *F. elatior* Ehrhart, the latter must yield precedence to Duchesne's earlier *F. moschata*. This was pointed out some years since by Decaisne (*Jardin Fruitier*,

ix. 36):—"Les noms de *Fragaria moschata* (Duch. 1766) et de *F. magna* (Thuill. 1790) devraient prévaloir, suivant les lois d'antériorité, sur celui de *F. elatior*, publié par Ehrhart (1792); mais ce dernier nom a été généralement adopté, et j'ai cru devoir le conserver moi-même, puisqu'il a été choisi dans cet ouvrage par Mme. Vilmorin."

The synonymy of the plant will run thus:—

F. MOSCHATA Duchesne, Hist. de Frais. p. 145 (1766). Weston, Botanist, ii. 327 (1771).
F. muricata Mill. Dict. ed. 8 (1768) non Linn.
F. magna Thuill. Fl. Paris, ed. 1 (1790), ex Decaisne; ed. 2, 254 (1799).
F. elatior Ehrh. Beiträge, vii. 23 (1792).

TWO OLD AMERICAN TYPES.

By Edmund G. Baker, F.L.S.

I.—Viola palmata L.

Dr. E. L. Greene, in an interesting and instructive paper entitled "Bibliographical Difficulties in Botany,"* which was read before the Botanical Society of America at Toronto last year, instances among other difficulties the case of *Viola palmata* L. He states that "not one among the botanists of the eighteenth and nineteenth centuries, knowing our several palmated violets, could say positively which one of these it was which Linnæus intended to designate by that specific name *palmata*. From the account which he gives of it, by bibliographic citation and otherwise, the problem is one of great difficulty." Dr. Greene goes on to say that some half-dozen species, in certain of their common forms, fall under the Linnean diagnosis of this plant—that his description covers *V. asarifolia* Pursh, *V. triloba* Schweinitz, *V. heterophylla* Muhl., *V. septemloba* Le Conte, *V. emarginata* Le Conte, and *V. atlantica* Britton.

The difficulty which Dr. Greene raises does not seem to us on this side of the Atlantic irremovable; and I venture to attempt a solution of the problem.

The Linnean diagnosis in Sp. Plant. ed. 1, 933, runs as follows:—

> "Viola acaulis, foliis palmatis quinquelobis dentatis indivisisque.
> Viola foliis palmatis sinuatis, stolonum reniformibus. Gron. Virg. 182.
> Viola virginiana, platani fere foliis parvis & incanis. Pluk. Mant. 187.
> Viola alba, folio securis romanæ [Amazoniæ] effigie, floridana. Pluk. Amalt. 209 [208], t. 447, f. 1 [9].
> Habitat in Virginia."

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* Printed in the Catholic University Bulletin, Washington, vol. iv. pp. 62–75.

It might perhaps be impossible to ascertain what plant Linnæus meant by his descriptive phrase, if there were no specimen in his herbarium. There is a specimen of Gronovius's plant in the National Herbarium, where there are also two gatherings from Plukenet of his plant. Dr. Greene assumes that Plukenet knew two forms—one glabrous, "typical *V. atlantica*," and the other pubescent. He also lays stress on the view that Plukenet's figure, t. 447, fig. 9 (erroneously cited by Dr. Greene as 114, fig. 7), represents a glabrous plant, and that "had Linnæus but given precedence to [this], we should have been compelled to accept *V. atlantica* for the type of *palmata*." But Plukenet's plant in Herb. Sloane xcii, f. 125 is without doubt the type of the figure cited, so far as the four leaves are concerned, although the flower has been added; and this specimen is in part distinctly pubescent, while the petioles and peduncle in Plukenet's other specimen (Herb. Sloane lxxxviii, 136) are pubescent throughout.

Having carefully compared the Linnean, Gronovian, and Plukenetian types, I find no difference between them, except that one leaf in Plukenet's specimen (Hb. Sloane lxxxviii, fol. 136) is almost entire; this, however, is the case in other examples of *palmata*, e.g. in specimens from Bartram in Herb. Banks. The lobing of the leaf of *V. palmata*, as shown in a very fine series from Rugel, is extremely variable. The plant figured by Dr. Britton as *V. palmata* in his *Illustrated Flora* well represents the species in question, except that the leaves in the types are not so much lobed.

A comparison of our large series of specimens with Dr. Britton's figure and description of *V. atlantica* suggests the possibility that that plant may be only an extreme form of *V. palmata*, but I have not studied the genus sufficiently to justify me in forming a definite conclusion.

II.—HELIOCARPUS AMERICANA L.

Mr. J. N. Rose has recently published (Contrib. U.S. Herb. vol. v. No. 3, pp. 125-129 (1897)) a revision of *Heliocarpus*, on which I propose to offer a few remarks. The author states in his introduction that "the type of the genus is *H. americanus*, one of the rarest species of all, although much material has been referred to it"; this, as he says, was based upon the figure (t. xvi.) and description in the *Hortus Cliffortianus*.

The brief history of the genus is as follows:—Linnæus (Gen. Pl. ed. 1, p. 157 (1737)) diagnoses it as *Heliocarpos*, referring to it *Montia* of Houstoun. The main figure in *Hortus Cliffortianus* (which is reproduced by Mr. Rose) was from a plant grown in Cliffort's garden; the fruit was supplied by Miller, as is acknowledged by Linnæus on the plate. The genus* was named from the character afforded by the fruit.

There are in the Banksian Herbarium Houstoun's specimens from Vera Cruz, which are the type of Miller's description in *Gard.*

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* See also *Critica Botanica*, p. 97, where Linnæus instances *Heliocarpus* as coming under "nomina generica, quæ characterem essentialem, vel faciem plantæ exhibent, optima sunt."

Dict., where Houstoun's name *Montia* is cited as a synonym. A figure of the plant bearing the same name, as well as a full description, is to be found in Houstoun's MSS., and another Houstoun specimen from Vera Cruz is in Herb. Sloane ccxcii, fol. 62. Mr. Britten agrees with me in considering that the fragments (consisting of fruits and one leaf) in Cliffort's herbarium are evidently a portion of the specimens sent by Houstoun, and were, as I have said, sent to Linnæus by Miller. It is true that Linnæus (Hort. Cliff. 211) implies some doubt as to the identity of Houstoun's *Montia* with *Heliocarpus*;* but there is no question as to the identity of the two. The figure of the plant (excluding the fruit) is from a plant (evidently young) in Cliffort's garden; it may be noted that Miller grew it from seed sent by Houstoun in Chelsea Garden, where "the plant produced flowers and ripened seeds several years."

Dr. K. Schumann unites several species with *H. americana*, among them *H. tomentosus* Turcz. I have carefully compared Linnæus's type specimens with Turczaninow's description, and with one of the plants on which he bases this, and cannot in any way separate them. Both are Mexican, *H. tomentosus* coming from Miradores and Oaxaca, while the typical *americana* is from Vera Cruz. The plants referred by Schumann to his *H. americana* var. *typica* have the lower surface of the leaf subglabrous, but both the Cliffortian and Houstounian specimens agree in having the leaves softly tomentose below,† and in this respect therefore these latter differ from the specimens which Dr. Schumann considers typical. In the light then of these facts a revision of the earlier species enumerated by Mr. Rose seems desirable.

H. AMERICANA‡ L. Sp. Pl. i. 448 (1753); Miller, Gard. Dict. ed. 8 (1768). *H. tomentosus* Turcz. Bull. Soc. Nat. Mosc. xxxi, pt. 1, 225 (1858).

Hab. Vera Cruz, *Houstoun*! Mirador, *Linden*, 857! Vera Cruz, *Galeotti*, 4155! 4162 ex Turcz. Orizaba, *Botteri*, 922! 882! *Pringle*, 6106! Cordova, *Bourgeau*, 1815! 1974!

This plant differs from *H. americanus* L. var. *typicus* K. Schum. by the leaves being densely stellately tomentose beneath. *Bourgeau* No. 1815 approaches *H. nodiflorus* Donnell Smith & Rose in general appearance, but the sepals are not appendiculate.

Var. SCHUMANNI. *H. americanus* L. var. *typicus* K. Schum. Fl. Bras. xii. pt. iii. 141, t. xxviii.

Hab. Brazil: Prov. Minas Geraes, Prov. St. Paulo. Bolivia, Paraguay, West Indies, &c.

The leaves are glabrous above, except the nerves, which are tomentellous, below they are subglabrous and green or cinereous, nerves sometimes hairy. The inflorescence is copiously branched, the sepals exappendiculate, and the stipes longer than in the next species.

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* "Hanc videtur Houstonus Montiæ nomine indigitasse in manuscriptis apud cl. Millerum visis."

† Linnæus states (Hort. Cliff. 211), "superficies utraque folii parum scabra, at viridis, concolor."

‡ The species being a tree, the specific name is rightly written as feminine by Linnæus.

H. Popayanensis H. B. K. Nov. Gen. v. 341 (1821). *H. americanus* L. var. *β Popayanensis* K. Schum. *l. c.*

Hab. New Granada: Prov. Popayan, *Triana*! Prov. Bogota, *Triana*! St. Martha, *Van Rohr*! Peru, Tarapoto, *Spruce*, No. 4558, has been referred here by Dr. Schumann. Bolivia, Mapiri, *Bang*, 1491, referred here by Mr. Rose.

This plant differs from *H. americana* L. var. *Schumanni* by the leaves, which are glabrous on neither surface; below they are fuscous subtomentose, with the nerves and veins hirsute; above in the original description they are said to be "adpresso pilosiusculis." They are subrotund and often trilobed.

There is in the National Herbarium a type of *Triumfetta hirta* Vahl, Symb. iii. 63, from St. Martha, collected by J. van Rohr. M. Triana has referred this to *Heliocarpus Popayanensis* H.B.K., and I agree in the identification.

Var. Purdiei. Foliis ovatis lobatis præcipue subtus molliter tomentosis basi cordatis, inflorescentia paniculata ramosa.

Hab. New Granada, near Velez, *Purdie*, Herb. Kew.

The leaves of the above variety are much more densely tomentose than in the type.

Var. trichopoda. *H. trichopodus* Turcz. *l. c.* 226.

Hab. Venezuela, near Galipan, *Funck & Schlim*, 150! (type). Columbia, *Moritz*, 210! Panama, *Cuming*, 1131! *Sutton Hayes*, 437! Venezuela, *Fendler*, 1277!

Triana (Prod. Nov. Granat. 221) unites this with *H. Popayanensis* H. B. K. I think, however, it may take varietal rank. The differences being that in *trichopoda* the stipe is longer, and the nerves of the leaves on the under side are not so hirsute.

H. arborescens Seem. Bot. Herald, 86 (1852–57).

Hab. Panama, *Seemann*!

This is reduced by Dr. Schumann to *H. americana*, but is considered, correctly I think, by Mr. Rose as a distinct species. It more resembles the true *H. americana* than any other species, but the leaves have a long acuminate point, and the sepals are appendaged.

H. appendiculata Turcz. *l. c.* 226.

Hab. Mexico, *Linden*, 1605! Guatemala, *Capt. Donnell Smith*, No. 1723! Costa Rica, Talemania, *Tonduz*.

This seems a good species—the leaves are discolorous, being reddish white below. The type is in very young fruit, and has a very short stipe; this, however, doubtless lengthens, and I have compared the Guatemalan specimen, and have no reason to doubt its being correctly named, although it is in a late-fruiting stage.

The remainder of Mr. Rose's species do not suggest matter for comment.

THE MOSSES OF SOUTH LANCASHIRE.

By J. A. Wheldon.

There does not appear to be any complete list in print of the mosses recorded for v.-c. 59. Few districts, however, have been so thoroughly and carefully worked by such a number of able bryologists, and therefore records are tolerably numerous. On the whole the vice-county is not a favourable one for mosses. There are no suitable habitats for the alpine species, and the uniformity of the geological features, and contiguity of large manufacturing towns with ever widening suburban districts, cause the number of species to be smaller than might be expected. One or two interesting "cloughs" in the east, the sand-dunes in the west, and the remnants of a few extensive "mosses" between are chiefly instrumental in raising the list above the commonplace, and many of these places are doomed in the near future to fall into the hands of the jerry builder.

I have compiled the following fairly representative catalogue of the species from the various local floras, from specimens in my collection, and from personal observations jotted down at intervals during a residence of seven years in the district. I have been obliged to omit many interesting notices of plants found near Todmorden by Mr. Nowell, and near Warrington by Mr. Wilson, on account of the difficulty of determining on which side of the boundary lines they occurred. I have no doubt that many so omitted will subsequently prove to have been found on the Lancashire side.

The majority of records given are the old ones from the Floras of Manchester and Liverpool. Unfortunately none of the editions of these publications deal with the vice-county *per se*, but embrace also portions of Cheshire, Derbyshire, and Yorkshire. The particular county of any given locality is rarely stated, except in Mr. John Whitehead's excellent appendix on mosses in the *Flora of Ashton-under-Lyne and District*. And even this, like the works before mentioned, contains many such entries as "common on clay banks," "frequent," &c., which in a list dealing with more than one v.-c. are utterly useless for census purposes.

Where I have found a plant still existing in a locality in the past seven years, I have added the sign !, but the absence of this mark does not in every case imply that I have searched there for it in vain. When a specimen from the locality exists in my herbarium the sign is doubled, thus !!. An asterisk precedes the names of plants now first recorded for the vice-county. The name of the finder follows that of the locality, and I have endeavoured to give the original discoverer as far as possible. I fear this has only been partially accomplished, especially in the Manchester district, from lack of available information. Many records from the Manchester flora by Mr. Grindon I have given on his authority, because I was unable to assign them to the true finder from the brief note in his introduction. I am responsible for all records not followed by a collector's name. The order of the species is that followed in Mr. Dixon's *Handbook Catalogue of British Mosses.*

Sphagnum cymbifolium Ehrh. Most Lancashire bogs, *Marrat.* —Var. *congestum* Schp. Rainford Moss, *Skellon.* Simmonswood Moss, *Harrison.*—*S. subsecundum* var. *contortum* Schpr. Warbreck Moor, *Marrat.* (Now extinct, *J. A. W.*) Burnley, *J. Whitehead* (*Dixon*)—*S. squarrosum* Pers. Rainford Moss, *Higgins.* Middleton, *Whitehead.*—*S. acutifolium* Ehrh. Rainford Moss, *Marrat.* Simmonswood Moss, *Harrison.* — *S. fimbriatum* Wils. Rainford and Parr Mosses, *Marrat.* Reddish, *Whitehead.* Warbreck Moor, *Higgins & Marrat.* (Extinct in latter place, *J. A. W.*). — *S. cuspidatum* Ehrh. Rainford and Simmonswood Mosses, *Harrison & Skellon.* Crosby, *Tudor.* Walton, *Gasking*!

Tetraphis pellucida Hedw. Knowsley!! Rainford and Bold, *Higgins & Marrat.* Skelmersdale, *Gasking*!!

**Catharinea undulata* W. & M. Ashton! Royton! Walton!! Common. — *Var. *Haussknechtii* Dixon. Walton!! As there is some doubt as to Brotherus's plant, this had better for the present go under Mr. Dixon's name, as my specimens do not exactly agree with the former. — *C. crispa* James. Rowley Moor, *Nowell.* Cheetham Hill and Prestwich Clough, *Whitehead*!!

Polytrichum nanum Neck. Wavertree, *Harrison.* Reddish, *Grindon.*—**P. aloides* Hedw. Ashton-under-Lyne!! Frequent.— *P. urnigerum* L. Knowsley, *Harrison.*—*P. piliferum* Schreb. Southport, *Marrat*! Rainhill, *Higgins.* Warbreck Moor!! Common.— *P. juniperinum* Willd. Knowsley and Rainford Mosses, *Sansom.* Rainhill, *Higgins.* Simmonswood Moss, *Skellon*!! Hightown!! **P. commune* L. Near Bury!! Walton!! Common.—*P. gracile* Dicks. Ashton Moss and Cheetham Hill, *Whitehead.* Holden Clough!! Taunton!!

Archidium alternifolium Schpr. Hyde Road, Manchester, *Hunt.*

Pleuridium axillare Ldb. Ashton, *Whitehead.* Burnley, *Dearden*!! Hulme, *Wilson.* — *P. alternifolium* Rab. Near Liverpool, *Taylor* (in *Hook. British Flora*). — *P. subulatum* Rab. Roby, *Harrison.*

**Ditrichum homomallum* Hpe. Clitheroe!!—*D. flexicaule* Hpe. Southport, *Marrat.* Crosby, *Skellon*!

(*Swartzia montana* Ldb. Rainford Moss, *Skellon.*) Requires confirmation.

Seligeria recurvata B. & S. Bamford Wood, *Whitehead*!! Ashworth Wood, *Grindon.*

Brachyodus trichodes Fürner. Bolton and Ainsworth, *Scholefield.*

**Ceratodon purpureus* Brid. Ashton!! Walton!! Formby!! Southport!!

Dichodontium pellucidum Schp. Bamford Wood, *Whitehead.*— Var. *fagimontanum* Schp. Clifton Junction, *Holt.*

Dicranella heteromalla.* Common. Walton!! Bardsley!!— Var. *sericea* Schp. Astley Chapel and Rochdale, *Wood.* Entwistle, near Bolton, *Whitehead.*—*D. cerviculata* Schp. Broadgreen, *Harrison.* Wavertree, *Marrat.* Ashton Moss, *J. Whitehead*!! Rochdale, *Whitehead.* Simmonswood Moss!!—*D. crispa* Schp. Oldham and Sailors-shore, *Whitehead*. Prestwich, *Tetlow*. Orford and other places near Warrington, *Wilson*.—*D. secunda* Ldb. Boggart Hole Clough, *Kent*. Sailors-shore, *Percival*.—*D. rufescens* Schp. Blackburn, *Wilson*. Bolton, *Scholefield*!! Mossley! Sailors-shore and Prestwich, *Whitehead*. Rainhill, *Marrat*.—D. varia* Schp. Frequent. Rochdale! Walton!! Southport!!—*Var. *tenuifolia* B. & S. Hightown!!—Var. *callistoma* Schp. Manchester, *Holt*.—*D. Schreberi* Schp. Rochdale, *Holt*. Wavertree, *Marrat*. Near Bardsley!!—Var. *elatum*. Kersal Moor, *Wild*. Bamford Wood, *Whitehead*. Prestwich, *Hunt*. Rochdale, *Holt*. Clifton, *Scholefield*!!—*D. squarrosa* Schp. Bamford Wood, *Whitehead*.

Blindia acuta B. & S. Bamford Wood, *Holt*.—Var. *trichodes* Braith. Bamford Wood, *Holt*. Marsden, *Whitehead*. Entwistle, *Scholefield*. Astley Chapel, near Bury, *Wood*.

Dicranoweisia cirrata Ldb. West Derby, *Skellon*! Smithdown Lane, *Marrat*. Bamford Wood, *Whitehead*. — *D. crispula* Ldb. Childwall, *Harrison*. Sefton and Garston, *Sansom*. Rochdale, *Grindon*.

Campylopus fragilis B. & S. The form *densus* at Woolton, *Marrat*.—*C. flexuosus* Brid. Simmonswood Moss, *Harrison*! Bamford Wood, *Whitehead*.—*C. pyriformis* Brid. Rainford Moss, *Marrat*. This was probably the plant recorded as *Distichum capillaceum* by Mr. Skellon; *Marrat*.

Dicranum Bonjeanii De Not. Simmonswood Moss, *Harrison*. Knowsley, *Marrat*. Hightown!!—*D. scoparium* Hedw. Common. Hightown!! Speke, *Marrat*.—(*D. fuscescens* Turn. Staly Brushes, Lancs., *Whitehead*!! I have a specimen so labelled, but the Brushes are in Cheshire.)—*D. Bergeri* Bland. Risley Moss, *Wilson*.

Leucobryum glaucum Schp. Simmonswood Moss, *Sansom*!!

Fissidens exilis Hedw. Daisy Nook, *Whitehead*!! Prestwich, *Hunt*. Walton!!—**F. viridulus* Wahl. Walton!! — *F. incurvus* Starke. Ashton, *Scholefield & Whitehead*. Orford Park, *Wilson*.—*F. pusillus* Wils. Winwick, *Wilson*. — *F. tamarindifolius* Wils. Ashton, *Whitehead*! Clifton Junction, *Hunt*.—**F. bryoides* Hedw. Common. Southport! Walton!! Failsworth!! — *F. crassipes* Wils. Hulme, *Wilson*. — (*F. osmundioides*, Hedw. This, recorded in Dickinson's *Flora of Liverpool*, has never been confirmed.)—*F. adiantoides* Hedw. Formby, *Marrat*. Taunton, *Whitehead*! Bamford Wood, *Whitehead*. — *F. taxifolius* Hedw. Not uncommon on the Lancashire side of the Mersey, *Harrison*!! Sefton, *Sansom*!

Grimmia apocarpa Hedw. Rare. Aigburth, *Marrat*. Fazackerley!—Var. *rivularis* W. & M. Bolton, *Rogers*. — *G. maritima* Turn. Dingle, *Marrat*. — *G. pulvinata* Sm. Smithdown Lane, *Marrat*. Frequent. Rochdale!! &c. — *G. trichophylla* Grev. Aigburth and Garston, *Marrat*.—*G. Doniana* Sm. Between Mosley Vale and Allerton, *Marrat*.

Racomitrium fasciculare Brid. Smithdown Lane, *Marrat*. Allerton, *Harrison*. West Derby, *Skellon*. Garston, *Sansom*. I have been unable to find this.—*R. aciculare* var. *denticulatum* Wils. Near Bolton, *Scholefield*!!—*R. heterostichum* Brid. Aigburth and Smithdown Lane, *Marrat*. West Derby, *Skellon*. (Probably extinct, *J. A. W.*). — *R. canescens* Brid. Ashworth Wood, *Grindon*. Gateacre, *Sansom*.—Var. *ericoides* B. & S. Garston, *Sansom*.

Ptychomitrium polyphyllum Fürnr. Walton, *Skellon*. Garston, *Sansom*. I have never succeeded in finding it. Extinct ?

Acaulon muticum C. M. Maghull and Kirby, *Skellon* ! Walton ! !

**Phascum cuspidatum* Schreb. Walton ! !—Var. *piliferum* H. & T. Crosby, *Marrat*.

Pottia Heimii Fürnr. Southport, *Marrat* ! !—*P. recta* Mitten. Manchester, *Hunt*. — *P. truncatula* Ldb. Daisy Nook, *Whitehead* ! Rochdale, *Whitehead* ! ! Walton ! ! Aintree ! ! Burscough ! !—**P. intermedia*, Fürnr. Walton ! ! — *P. Wilsoni* B. & S. Southport, *Wild*. Blackburn, *Wood*.—*P. littoralis* Mitt. Southport, *Boswell* ! ! Crossens ! !—**P. minutula* Fürnr. Several places near Walton and Aintree ! !

Tortula pusilla Mitt. Between Broadgreen and Roby, *Harrison*. —*T. rigida* Schrad. Blackburn and Burnley, *Hunt*.—*T. ambigua* Angstr. Between Garston and Aigburth, *Marrat*. Clitheroe, *Wilson*. Blackburn and Burnley, *Hunt*. — *T. aloides* De Not. Blackburn, *Hunt*. Walton ! !—**T. muralis* Hedw. Common everywhere ! !— **T. subulata* Hedw. Abundant from Crosby to Southport ! !—(Var. *subinermis* Wils. Near Warrington, *Wilson*.) — *T. ruralis* Ehrh. Southport ! ! Sand-hills both sides of Mersey, *Marrat*.—*T. ruraliformis* Dixon. Southport, *Hunt* ! ! Frequent on the sand-hills from Crosby to Southport ! !—(*T*, *papillosa* Wils. Trees at Ashton, *Whitehead* ! ! These were on cut timber from Welshpool, Wales.)

Barbula rubella Mitt. Ashworth Wood, *Grindon*. Crosby to Southport ! ! Warbreck Moor ! ! — *B. tophacea* Mitt. Southport, *Marrat* ! ! Newton Heath, *Lees*. Kersal Moor and Clifton, *Whitehead*. Winwick Quarry, *Wilson*. Walton ! ! Hightown ! ! The latter apparently the "*forma luxurians*," Braith. — Var. *acutifolia* Schpr. Manchester, *Dr. Wood*. (Warrington, *Wilson*.) Walton ! ! —*B. fallax* Hedw. Bardsley ! ! and Daisy Nook ! *Whitehead*. Royton ! ! Walton ! ! Aintree ! !—*B. rigidula* Mitt. Broughton, *Wild*. Garston, *Harrison*. Southport, *Marrat*. Bamford Wood, *Grindon*. —*B. vinealis* Brid. Southport ! ! *Marrat*. — *B. Hornschuchiana* Schultz. Newton, *Wilson*. Burnley, *Dearden* ! !—*B. revoluta* Brid. Childwall, *Harrison*. Clifton, *Grindon*.—*B. convoluta* Hedw. Southport, *Marrat*. Bardsley ! ! Milnrow ! ! Hightown ! ! — *B. unguiculata* Hedw. Holden Clough, *Whitehead* ! ! Bardsley ! ! Walton ! ! Melling ! !

Leptodontium flexifolium Hpe. Manchester, *Hobson*.

Weisia crispa Mitt. (Windle, *Skellon*. Doubtful.) Hulme, *Wilson*.—**W. squarrosa* C. M. Walton ! !—**W. microstoma* C. M. Frequent about Walton ! !—*W. viridula* Hedw. Bamford Wood and Oldham ! *Whitehead*. Walton ! ! Southport ! ! — Var. *stenocarpa* B. & S. Speke Hall, *J. H. Lewis* (*Dixon*).—*W. tenuis* C. M. Park Lane, Broughton, *Holt & Wild*. — *W. rupestris* C. M. Bamford Wood, *Whitehead* ! ! — (*W. curvirostris* C. M. Crosby, *Dickinson*. West Derby, *Skellon*. Gateacre, *Harrison*.) These require confirmation.

Trichostomum mutabile Bruch. Dingle, *Marrat*. Still there, *Gasking*!! 1898.—Var. *littorale.* Southport, *Cash*!! Hall Road!! —*T. flavo-virens* Bruch. Southport, *Burgess & Holt.*—*T. tenuirostre* var. *Holtii* Dixon. Bamford Wood, *Holt.*

Encalypta streptocarpa Hedw. Sand-hills on both sides of the Mersey, *Skellon.* Formby!! Hightown!!

Zygodon conoideus H. & T. Manchester, *Hobson.*

Orthotrichum cupulatum.* Clitheroe! —*Var. *nudum.* Chatburn!! —O. saxatile* Milde. Clitheroe!! Chatburn! — *O. affine* Schrad. Warbreck Moor and Speke, *Marrat.* Extinct there now? Jackson's Boat, *Grindon.* — *O. diaphanum* Schrad. Bold, *Higgins.* Manchester, *Barker.* Chatburn!!

Ulota crispa Brid. Rainhill, *Higgins & Marrat.*

Schistostega osmundacea Mohr. Between Tyldesley and Worsley, *Evans.*

Splachnum ampullaceum L. Simmonswood and Rainford Mosses, *Shepherd.* Probably common on the Lancashire Mosses formerly, but very rare now.—*S. sphæricum* L. f. Chat Moss, *Grindon.*

Tetraplodon mnioides B. & S. Rainford Moss, *Skellon.* Windle Moss, *Higgins.* Chat Moss!! *Grindon.*

Discelium nudum Brid. Manchester, *Caley*!! Boggart Hole Clough, Haughton Dale, and Sailors-shore, *Whitehead.* Bolton, *Sims.*

Ephemerum serratum Hpe. Liverpool Bot. Gardens, *Skellon.* Walton!!—Var. *angustifolium* B. & S. Fallow-field, Walton, with the type!!

Physcomitrium pyriforme Brid. Between Wavertree and Broadgreen, *Harrison.* Crosby and N. Liverpool, *Skellon*! Taunton, *Whitehead*! Walton!!

Funaria fascicularis* Schp. Rail banks, Walton!! — *F. Templetoni* Sm. Clifton, *Horsefield.*—F. hygrometrica* Sibth. Common. Very fine from Hightown to Southport!!

Amblyodon dealbatus P. B. Sand-hills from Crosby to Southport, *Marrat*!!

Meesia trichoides Lpr. Southport, *Marrat*!! Sailors-shore, *Percival.*

Aulacomnium palustre Schwgr. Formby and Simmonswood, *Harrison*! Taunton, *Whitehead*! Formby!!—*A. androgynum* Schwgr. Bootle, *Skellon.* Now gone? Walton, *Fisher*!!

Catoscopium nigritum Brid. Southport, *Higgins*!! Formby, *Scott*!!

Bartramia pomiformis Hedw. Aintree, *Tudor*!! Broadgreen, *Sansom.* Childwall, *Harrison.* Walton!! Rapidly dying out.

Philonotis fontana Brid. Ashton, *Whitehead*! Simmonswood Moss, *Skellon*! Formby!!

Leptobryum pyriforme Wils. Formby, *Higgins*! Clifton Junction, *Holt.* Ashton!! Southport!! Walton!!

Webera elongata Schwgr. Shawforth, *Grindon.*—*W. cruda* Schwgr. Bolton, *Grindon.*—*W. nutans* Hedw. Taunton, *Whitehead.* Rainford Moss, *Skellon.* Simmonswood Moss, *Harrison*! Walton!!—*W. annotina* Schwgr. Clifton, Taunton!! and Bamford Wood, *Whitehead.*—*W. carnea* Schpr. Broadgreen, *Harrison.* Near Liverpool, *Skellon*! Sailors-shore, *Percival.* Clifton, *Whitehead.* Walton ! ! Hightown ! ! — *W. albicans* Schpr. Taunton, *Whitehead* ! ! Boggarts Hole Clough, *Whitehead* ! ! Walton ! ! Southport ! !

Bryum pendulum Schpr. Taunton, *Whitehead* ! ! Common on the sand-hills from Hightown to Southport ! !—*B. Warneum* Bland. Southport, *Marrat & Wilson* ! ! Taunton, *Whitehead & Scholefield*. Birkdale, *Wild* ! ! — *B. calophyllum* R. Br. Southport, *Marrat* ! ! Taunton, *Gordon & Whitehead*. — *B. Marratii* Wils. Southport, *Marrat* ! ! Ainsdale, *Marrat*.—*B. lacustre* Brid. Taunton, *Schimper, Whitehead, & Gordon* ! ! Freshfield, Ainsdale, and Southport ! ! *Hunt*. — *B. inclinatum* Bland. Crosby to Southport, on the sand-hills, *Marrat* ! ! Ashton-under-Lyne, *Whitehead* ! ! — *B. uliginosum* B. & S. Southport ! ! *Marrat & Wilson*. Taunton and Prestwich, *Hunt*. Sailors-shore, *Percival*. Near Manchester, *Wood*. — *B. pallens* Swartz. Southport ! ! *Marrat*. Between Broadgreen and Roby, *Harrison*. Taunton ! ! Boggarts Hole Clough, and Sailors-shore, *Whitehead*. Walton ! !—*B. turbinatum* Schwgr. Scar Wheel, Broughton, *Grindon*. Clifton Junction, *Wild*. Ashton, *Gordon & Whitehead* ! ! — *B. bimum* Schreb. Taunton and Clifton Junction, *Whitehead*. Litherland, *Marrat*. Olive Mount, *Harrison*. — *B. pseudo-triquetrum* Schwg. Croxteth Park, *Harrison*. Bamford Wood, *Whitehead*. Southport, *Wild* (*Dixon*). — Var. *compactum* B. & S. Southport ! ! *Whitehead*.—*B. neodamense* Itz. Southport, *Wood*.—*B. affine* Ldb. Orford, *Wilson*. Eccles and Old Trafford, *Hunt*. Taunton, *Whitehead*. — *B. intermedium* Brid. Taunton, *Whitehead* ! Manchester, *Cash* ! ! Southport ! ! Walton ! ! Rochdale ! !—*B. cæspiticium* L. Bamford Wood and Stretford, *Whitehead*. Ince Blundell ! — **B. capillare* L. Frequent on walls, &c., and banks ! ! Formby ! ! — *B. Donianum* Grev. Winwick Quarry, *Grindon*.—*B. atropurpureum* W. & M. Wavertree, *Marrat*. Cheetham Hill and Clifton Junction, *Whitehead*. Sparingly near Walton ! !—**B. argenteum* L. Very common. Milnrow ! ! Taunton ! ! Walton ! ! — Var. *lanatum* B. & S. Southport, *Wild*. Formby, *Lewis* (*Dixon*). — *B. roseum* Schreb. Bootle, *Skellon*. Not there now, *J. A. W.* Hightown ! !

Mnium affine Bland. Childwall and Firgrove, *Harrison*. Medlock Vale and Reddish, *Whitehead & Scholefield*. Formby ! — *M. cuspidatum* Hedw. Formby and Southport, *Marrat*.—*M. rostratum* Schrad. Formby, *Harrison*. Ainsdale, *Marrat*. Bamford Wood, *Whitehead*. Aintree and Fazackerly ! !—*M. undulatum* L. Formby, *Marrat*. And many other places.—**M. hornum* L. Common from Manchester to Southport ! !—*M. serratum* Schrad. Between Birkdale and Ainsdale, *Marrat*. Bamford Wood, *Holt*. Clifton Junction, *Whitehead*. — *M. stellare* Reich. Between Birkdale and Ainsdale, *Marrat*. — *M. punctatum* L. Firgrove, *Harrison*. Bamford Wood, *Whitehead*. Ashton ! !—*M. subglobosum* B & S. Ashton and Reddish, *Whitehead* ! !

Fontinalis antipyretica L. Bootle, *Dickinson*. Fazackerley, *Harrison*. Waterhouses, *Whitehead*.—*F. squamosa* L. Blackley, *Whitehead*.

**Leucodon sciuroides* Schwgr. Between Chatburn and Clitheroe ! !

Myrinia pulvinata Schp. Jackson's Boat, *Buxton*. Now lost.

Leskea polycarpa Ehrh. Jackson's Boat, *Hunt*.

Heterocladium heteropterum B. & S. Bamford Wood, *Whitehead.* Bolton, *Makin* (*Dixon*).

**Thuidium tamariscinum* B. & S. Hightown and Formby ! ! Near Clitheroe ! !

Climacium dendroides W. & M. Formby, *Marrat* ! Hightown ! ! Ainsdale !

Isothecium myurum Brid. Shawforth, *Grindon.*

Pleuropus sericeus Dixon. Aintree, *Higgins & Marrat.* Bootle ! ! Clitheroe and Chatburn !

Camptothecium lutescens B. & S. Crosby, *Skellon.* Kersal Moor, *Holt.*

Brachythecium glareosum B. & S. Kersal Moor, *Holt.* — *B. salebrosum* B. & S. Crosby to Southport, *Marrat.* This is var. *Mildeanum* Schpr. ! !—*B. albicans* B. & S. Crosby, *Fisher* ! ! Southport, *Marrat* ! ! Formby, *Dickinson* ! ! Abundant on the sand-hills; fruiting freely.—**B. rutabulum* B. & S. Very common throughout the district ! ! — *B. rivulare* B. & S. Reddish, *Whitehead.* Holden Clough ! !—*B. velutinum* B. & S. Broadgreen, *Harrison.* Litherland, *Tudor* ! ! Reddish, *Whitehead.* Walton ! ! Southport ! !—*B. populeum* B. & S. Bamford Wood, *Whitehead.* Clitheroe ! !—*B. plumosum* B. & S. Ashworth Wood, *Grindon.* Bamford Wood, *Whitehead. B. purum* Dixon. Frequent ! Formby c. ft., *Marrat.*

Eurhynchium piliferum B. & S. Garston, *Marrat.* Ince Wood ! ! —**E. crassinervium* B. & S. Hightown ! !—**E. prælongum* B. & S. Very common. Fazackerley ! ! Clitheroe ! ! — *E. Swartzii* Hobk. Winwick, *Grindon.* Walton ! ! — *E. pumilum* Schp. Knowsley Park, *Harrison.* Winwick Quarry, *Grindon.* Bamford Wood, *Holt.* —*E. myosuroides* Schp. Croxteth, *Harrison.* Clitheroe ! ! — *E. striatum* B. & S. Broadgreen, *Harrison.* — **E. rusciforme* Milde. Skelmersdale, *Gasking* ! Reddish ! — *E. confertum* Milde. Roby, *Harrison.* Walton ! ! Melling ! !—*E. megapolitanum* Milde. Crosby, *Harrison & Wilson.* Birkdale ! !

Plagiothecium depressum* Dixon. Fazackerley ! !—*P. Borrerianum* Spr. Bamford Wood, *Whitehead.*—P. denticulatum* B. & S. Aintree ! ! Linacre ! ! Common. — Var. *obtusifolium* H. & T. — Lark Hill, *Skellon.* — *P. sylvaticum* B. & S. Warbreck Moor, *Marrat.* Not there now ? *P. undulatum* B. & S. Gateacre, *Harrison.* Simmonswood Moss, *Skellon.* Warbreck Moor, *Higgins & Marrat.* Not in latter locality now.—*P. pulchellum* B. & S. Burnley, *Dearden* ! !

Amblystegium Sprucei B. & S. Southport, *Wood.* — (*A. radicale* P. B. Huyton, *Higgins & Marrat.*) Requires confirmation.—Var. *serotinum* Lindb. Southport, *Rogers.* — *A. varium* Ldb. Stretford, *Hunt.* — *A. filicinum* De Not. Olive Mount, *Harrison.* Dingle, *Gasking* ! Clitheroe ! A peculiar form of this plant occurs at Birkdale, which I described and figured in *Science Gossip*, January, 1896. I have since issued it under the MS. name of var. *Whiteheadii.* Since then I have submitted specimens to Mr. Dixon, who, while admitting it to be a marked form, which has not been before described as a variety, suggests for the present it had better be placed under *forma prolixa* De Not., "as, if not the same, it is too near to be really separable." With this decision I agree; but should further observation of the specimens or the discovery of fruit show additional differences (and a few slight ones exist already), I should like it to bear the name I have suggested, in commemoration of many services freely rendered to bryologists by Mr. Whitehead.—*A. serpens.* Waterhouses, *Whitehead.* Croxteth, *Harrison.* Common ! ! — Var. *depauperatum* Boulay. Southport, *Wood.* Formby, *Scott* ! ! Hall Road ! !

Hypnum riparium L. Bamford Wood, *Whitehead.* Walton ! ! Common. — *Var. *longifolium* Schp. Walton ! ! — *H. elodes* Spr. Southport, *Marrat & Wilson* ! ! — *H. chrysophyllum* Brid. Newton Viaduct, *Grindon.* Ashton, *Gordon.* Taunton, *Whitehead* ! ! Crune Lake ! ! — *H. polygamum* Schp. Southport to Crosby, *Harrison* ! ! Warbreck Moor, *Marrat* ! Taunton, *Gordon.* Rochdale, *Whitehead.*—Var. *stagnatum* Wils. Newton Viaduct, *Wilson.* Southport, *Wild* (*Dixon*). — *H. stellatum* Schreb. Waterhouses, *Whitehead.* Rainhill, *Higgins.* Southport ! ! where also a tall form of *H. polygamum* occurs, simulating this species.—*H. aduncum* Hedw. Warbreck Moor, *Fisher.* (I suspect this to have been a form of *H. riparium*, which grows there now and simulates this species.)—*H. Kneiffii* Schp. Ashton, *Hunt.* Park Bridge, *Whitehead* ! ! Southport, *Marrat* ! ! West Derby, *Harrison.*—*H. Wilsoni* Schpr. Southport ! ! *Wilson.*—*H. lycopodioides* Schwgr. Southport, *Marrat* ! !—*H. fluitans* L. Clifton Junction, *Whitehead.* Rainford Moss, *Dickinson.* Crosby, *Skellon.* Southport ! ! — **H. exannulatum* Gümb. Birkdale ! ! — Var. *stenophyllum* Hobk. Simmonswood Moss, *Marrat.*—*H. uncinatum* Hedw. Knowsley, *Marrat.* Bamford Wood, *Whitehead.*—*H. revolvens* Sw. Burnley, *Whitehead & Holt* ! ! Southport, *Marrat.*—Var. *Cossoni* Ren. Southport, *Wild* (*Dixon*). —*H. commutatum* Hedw. Bamford Wood, *Whitehead.* Aintree, *Marrat.* Not in the latter locality now.—*H. falcatum* Brid. Clifton, *Wild* (*Dixon*).—**H. cupressiforme* L. Common. Abundant on the sand-hills ! ! — *Var. *ericetorum* B. & S. Simmonswood Moss ! !— *Var. *elatum* B. & S. Hightown ! ! — (*H. Patientiæ* Ldb. Hale, *Marrat.* Requires confirmation, as it is doubtful whether the Hale referred to is in Lancashire or Cheshire.)—*H. molluscum* Hedw. Hightown, *Marrat.* Bamford Wood, *Whitehead.* Rochdale, *Grindon.* Clitheroe ! !—*H. crista-castrensis* L. Whitworth, *Grindon.*— *H. palustre* L. Bamford Wood and Rochdale, *Whitehead.* St. Helen's, *Marrat.* Clitheroe !—*H. scorpioides* L. Southport, *Marrat.* —*H. stramineum* Dicks. Prestwich, *Percival.* Simmonswood, *Marrat.*—*H. cordifolium* Hedw. Rainhill, *Higgins.* Reddish, *Whitehead.* Formby and Sefton, *Skellon.* Hightown ! — *H. giganteum* Schp. Birkdale, *Marrat* ! !—**H. cuspidatum* L. Common. Fruiting at Walton and Bardsley ! !—*H. Schreberi* Willd. Frequent ! Crosby, *Harrison & Skellon.*

Hylocomium splendens B. & S. Southport, *Marrat* ! Crosby, *Dickinson* ! Frequent.—*H. loreum* B. & S. Wavertree, *Marrat.*— **H. squarrosum* B. & S. Clitheroe (in fruit) ! ! — **H. triquetrum* B. & S. Formby ! Ince Blundell !

I have to thank Messrs. Dixon, Horrell, and Gasking for supplying several records which I should have otherwise overlooked.

WAYFARING NOTES IN RHODESIA.

By R. Frank Rand.

A business trip took me in December, 1897, as far as Salisbury, the capital of the Rhodesian territory. The route was by rail from Capetown to Bulawayo (1360 miles), thence onwards to Salisbury by coach, another 280 miles. There was rain, heavy tropical rain, almost every day, and such weather proves trying to a collector, for, saturated as the air is with moisture, one is apt, even with care, to lose a number of specimens. Mildew attacks the specimens even within one or two days, those with any succulence being the worst sufferers. One tries different methods. I found placing the succulent specimens between layers of absorbent cotton-wool fairly protective. It is handiest in the form of Gamgee tissue, and in this form the thin layer of gauze covering the wool prevents the cotton-fibres from clinging to the specimen. Free ventilation is of course essential, and I found sheets of corrugated paper, such as bottles are packed in, placed at very frequent intervals between the specimens when under pressure, gave good results. I was able to make no extended excursions, and the following notes merely refer to short walks in the neighbourhood of Bulawayo and of Salisbury, and to the strip of country along the coach road connecting the two towns.

One crosses the limits of certain species in making this journey, as some of the trees noted in Bulawayo (Matabeleland province) were not discoverable in Salisbury (Mashonaland province), and the converse was likewise true. Round about Bulawayo the trees have been terribly hacked about by the natives in quest of wood for fuel and for hut-poles. The heaviest timber seen was in the valleys of the big rivers—the timber in the open country being mostly of medium size. Fairly open woodland was crossed from time to time, but no dense forest.

As to species, the trees are very mixed, although here and there certain species are grouped to the exclusion of others. The willow, growing by the river-banks, was the only tree noticed likely to be familiar to an eye unused to any but English woodland. The spring tints of many of the trees are very fine, notably those called by the natives *masasa*, also another called *machabel*. Their leaves show all tints of green, yellow, and pink, many of the colours being such as were known a few years ago as "Liberty" shades. Certainly art here only hobbles after nature.

Clumps of large granitic or gneissic boulders tumbled in heaps are a common landscape feature—the so-called *kopjes*. In the pockets of earth in the many crevices, large and small, among these rocks, growth is apt to be very luxuriant and of more tropical cast than in the surrounding country; I suppose it is that the huge boulders absorb much of the sun's heat, conserving it and giving it off to the soil around, and so acting in some sort as a natural forcing-house.

Growth is also apt to be luxuriant upon old large ant (termite) heaps. Besides bringing up the deep soil to the surface and enriching it with their secretions, these creatures generate a large amount of heat, and upon a sharp cold morning one may distinctly feel a current of hot air ascending if the hand be placed over the top of one of the chimney-like vents which are raised upon the surface of the main mound.

As to fertilization. Butterflies carry out some of this work, but I should judge the largest share is carried out by beetles, which are extraordinarily abundant and of many species. Ants too, I think, carry out a fair share, and in some Asclepiads their tastes appear to be specially catered for.

As to colours. Varied as the flowers are in colour, there was nevertheless among such flowers as I saw blooming in December a noticeable preponderance of yellows and whites.

Whether locusts have modified the flora of Africa to any extent is a question that must occur to one who sees them in swarm. They ravage year after year, and it is marvellous how so much escapes them. Certainly they swarm in the dry season, when flowering is mostly over. It is said they are apt to be less troublesome after a very wet rainy season. Possibly the thorns which are so prevalent in many African plants may serve as a protection against locusts, as well as against the hunger of antelopes and the like.

In Rhodesia there are roughly only two seasons, the wet and the dry; the wet constituting summer, the dry winter. The rains come on by degrees, commencing usually about the end of October, the showers increasing in extent on until February, when they tail off again, ending about April. But there is great variation in this regard, some rainy seasons being much wetter than others. In April the nights are getting much cooler, and by May and June one may see a thin coating of ice upon water left standing out in a pail all night. The early spring flowers come up before the first rains. Some of the trees throw out their new foliage in advance of the rains, notably the *masasa*, previously referred to.

In so rapid a run through the country one can only get a very general impression, but members of the following natural orders were noticeably abundant:—*Leguminosæ*, *Cucurbitaceæ*, *Malvaceæ*, *Convolvulaceæ*, *Asclepiadaceæ*, *Liliaceæ*, *Amaryllideæ*, and *Irideæ*. The Asclepiads showed an astonishing variety of forms. Fungi of many species were abundant.

The journey from Bulawayo to Salisbury was made early in December, and on the road one saw large numbers of a species of *Brunsvigia*, its bulb large as a man's head, and standing partly out of the ground. Its leaves are arranged like an opened fan, the scape jutting out at one side, and crowned with a large umbel. Earlier in the year, when the flowers first appear, they are deep cherry-red in colour; but in December the long, rigid, dried ovaries, crowned by the dried-up perianth as plume, form a globular mass of spokes often as much as two feet in diameter. Later on, the the upper portion of the ovaries is expanded flange-fashion, and so forms so many wind-vanes. Early in December, as I passed these plants, all sail was set, but the umbels were still firmly attached to the scape. Later in the month they were all detached, for a joint much like that between falling leaf and stem forms between the umbel and scape, and there is also some decay of the scape at the point of attachment. Once detached this globular mass careers over the veldt, carried at great speed before the wind, and some must travel many miles ere they become caught in some clump of grass or entangled in some bush, there to come to rest and break up. As the wind is mostly from an easterly direction at the time this migration takes place, it is interesting to speculate upon the probable effect of time upon the distribution of this plant, for one would expect it to be swept from sea to sea. The road from Bulawayo runs roughly north and south, and therefore across the track taken by these travellers. Here and there drainage trenches have been dug along the sides of the road, and in these trenches the globular masses were trapped by thousands.

Many of the more delicate herbaceous plants seek the shade of some bush and scramble up among its branches, or nestle at its roots. Some close during the fierce heat and glare of noonday. One finds the same species varying greatly in size, according as conditions are favourable or not. Noticeable as this was, perhaps this is just as much the case at home among our English wild flowers. Many of the creeping herbaceous plants growing upon open sandy or thin soil form very pretty star-like and allied patterns as they radiate out upon the ground.

The few epiphytic orchids I have seen have been in the forest belts of the large river-valleys. There are a good number of ground orchids, some of considerable beauty. A white one, which grows in the swamps, is very delicately scented; but they are mostly scentless. Great tracts of country are covered with Proteas of several species, as bush and undersized tree. Arums are common, cream-yellow, not white, as in Cape Colony; the leaves are spotted. Giant candelabra-like Euphorbias are common. The grapple-plant was abundant near the Shashi river. No Mesembryanthemums and no heaths were noticed.

The Kafirs of Rhodesia—both Matabeleland and Mashonaland provinces—do not cultivate flowers, so far as I could discover; neither do they use the many beautiful wild ones which lie ready to hand for the decoration of their persons or their dwellings. And in this connection the absence of domestic pets may be noted—if one excepts the dog; and to say a Kafir's dog has "a dog's life of it" conveys a fairly accurate impression.

Travelling up by rail as one approached Khama's country, one saw from the carriage windows quantities of *Bauhinia*. Perhaps cut down by the construction men, as the rail was newly completed, it formed small stumpy bushes, and did not appear to be a climber; the white, delicately-veined petals were very beautiful. In this country and to the northwards a long way, especially affecting barren places, one saw a *Vellozia* with tufts of leaves and lilac-coloured flowers springing out from its odd-looking stem.

There was a delay of a few hours at Palapwe, Khama's capital, and here round about the railway-station—which is a few miles from the native town—a *Stapelia* was common; also a short stunted globular-stemmed *Euphorbia*, the flowers springing from finger-like projections from the stem, the whole plant only some six inches or so in height; shade-seeking.

Another plant which hugged the roots of the stunted bush hereabout was *Decabelone*, Mr. N. E. Brown thinks probably *D. elegans* Dcne. The stems consisted of several *Euphorbia*-like rods, many-angled and beset with spines, the whole plant about a foot in height. The flower, large and campanulate in shape, springs by a very short stalk from close to the ground. The short limbs of the corolla are dull yellowish brown in colour, but the interior of the bell is of a deep maroon colour, approaching black. On first catching sight of the flower it looks much like a hole in the ground. The odour of the flower is offensive, and suggestive of cheese. I was unfortunately not able to catch sight of the particular insect or insects for which this lure was spread.

I have to express my thanks and the great obligations I am under to the officials of the Botanical Department of the British Museum, where my collection is deposited, as also to Mr. Hiern and to Mr. Spencer Moore.

Mr. Rendle has favoured me with the following description of a new species of *Moræa*, which is conspicuous upon the veldt from the unusually dark maroon colour of the flower. Upon closer inspection it shows an interesting feature. The circumference of each flower-stalk is covered for about an inch in extent by a layer of clear sticky matter, which proves an effective bar to any raiding of the flower by insects crawling up from below. Ants were the raiders against whom this provision seemed to be aimed, if one might judge from the numbers of them trapped, for many of them were glued hopelessly fast to the flower-stalk, and some remain sticking even in the dried specimens. The sticky layer is confined to a definite area of the stalk, and is very adhesive, as is apparent still in the dried plant.

Moræa Randii Rendle, sp. nov. Planta glabra rigida pro genere elatior, caulibus erecto-ascendentibus valde flexuosis ramosis, ramis ascendentibus sæpe unilateralibus, internodiis superioribus et pedunculis annulo viscido in parte superiore munitis; foliis rigidis, infimis membranaceis brevioribus, caulem arcte vaginantibus, superioribus accrescentibus mox linearibus, e basi latiore plicatis, sub apice angustata planis, in ramis florentibus iterum diminuentibus anguste-lanceolatis acuminatis; pedunculis rigidis subpatentibus, spathis e basi lata lanceolatis, 2–3-floris; perianthio lurido-purpureo, Segmentis e basi in unguem brevem angustata oblanceolatis in margine superiore valde crispulatis et lutescentibus; antheris oblongis loculis parallelis; ovario anguste elliptico basi angustato apice rostrato; capsulo subgloboso, seminibus rufescentibus.

A fine plant, the stout spreading ascending shoots reaching nearly 3 ft. in length; completely enveloped below the first branch by the leaves, which pass from the membranous sheaths at the base into two or three produced linear leaves 7½–10 in. long by 2–2⅔ lines broad; spathes about 1¼ in. long; outermost leaf ovate, 7–10 lines long. Inflorescence large, distichously branched and spreading, peduncles 1½–3 in., flowers with the ovary just clear of the point of the spathe; perianth-segments 14 lines long by 3–6 lines broad, staminal tube 5 lines long, free portion of filament 1 line, anthers 2 lines; bifid stigmas with their thread-like segments 5 lines long. Ovary ⅓ in. long. Capsule 5 lines each way, with a round slightly flattened apical area.

Hab. Bulawayo, Jan. 1898, *R. Frank Rand.*

Near *M. glutinosa* Baker, found by Welwitsch in Huilla, with the plants of which district those obtained by Mr. Rand show considerable affinity. The new species is, however, a larger plant, with wider branching, more floriferous, inflorescence, and slightly larger flowers with broader perianth-segments.—A. B. R.

BIOGRAPHICAL INDEX OF BRITISH AND IRISH BOTANISTS.

By James Britten, F.L.S., and G. S. Boulger, F.L.S., F.G.S.

First Supplement (1893–97).

(Continued from p. 103.)

Bobart, Tilleman (fl. 1650–1720). Son of Jacob Bobart the elder. Friend of W. Sherard. Found *Mentha sativa*, R. Syn. ii. 124; Clarke, 57. Pult. i. 313; Nich. Illustr. i. 357, 366. 369; Dict. Nat. Biog. v. 285; Druce, Fl. Berks, cxxv.

Bohun, Edmund (fl. 1700–2). Collected in South Carolina, 1700–2. Sent plants, &c., to Petiver. Mus. Pet. 79, 94.

Bonavert (or **Bonivert**), **Gideon** (fl. 1696). "Plants gathered in Flanders at Breda and at the several camps wherein he was a Lieutenant in the English army, amongst which are mosses, grasses, fungi, &c.," H. S. lxxxv. "Plants gathered in the fields and gardens of England, at Chelsea, &c.," many named by him in Latin, French, and English. H. S. lxxxvi*. Sent pl. from Ireland to Plukenet, Alm. 284, 312, 344. H. S. xcvii., 74, 143; and from Deal to Petiver, Mus. Pet. no. 405.

Bond, George (fl. 1826–80). Kew gardener. Drew 1700 plants for W. T. Aiton, 1826–35. Gardener to Lord Powis at Walcot, 1835–80. Garden, 24 Jan. 1880, 75.

Bosanquet, Rev. Edwin (1800?–72): b. London, 1800?; d. 30 Aug. 1872. M.A., Oxon, 1826. Rector of Forscote, Somerset, 1848–70. 'Plain and easy account of Brit. Ferns,' 1854; ed. 2, 1855. Jacks. 240; Alumn. Oxon. i. 134.

Bossey, Francis (fl. 1820–60). M.D. Of Woolwich. 'Fungi which attack cereals,' Proc. Bot. Soc. Lond. 50. 'Kent Plants,' Ann. & Mag. ii. (1839), 272. Contributed to Gibson's Fl. of Essex.

Bostock, John (1773–1846): b. Liverpool, 1741; d. London, Aug. 1846. M.D., Edinb., 1798. Pres. G.S., 1826. V.-P.R.S.,

1832. Of Liverpool till 1817. Friend of Roscoe. Found *Erythræa latifolia*, Smith, Fl. Brit. iii. 1393; Clarke, 49. Smith Corr. ii. 328; Gent. Mag. 1846, ii. 65; Dict. Nat. Biog. v. 422.

Boswell, Henry (1837–97): b. Oxford, 27 Jan. 1837; d. Headington, Oxford, 4 Feb. 1897; bur. St. Sepulchre Cemetery, Oxford. Hon. M.A., Oxon, 1881. Bryologist. 'London Cat. of Brit. Mosses' (with C. P. Hobkirk), 1877. Contrib. to Phytologist, 1860; to Journ. Bot. from 1872. Herbarium at Oxford Bot. Garden. R.S.C. i. 50; vii. 222; ix. 301; Journ. Bot. 1897, 132, with portr.; Druce, Fl. Berks, clxxxi.

Bourne, Edward (fl. 1794). 'De plantarum irritabilitate,' Edinb., 1794. Pritz. 37.

Brewer, James Alexander (fl. 1838–90): d. Australia. Local Sec. Bot. Soc. Lond., 1839. 'Flora of Reigate,' 1856. 'Flora of Surrey,' 1863. Pritz. 40; Jacks. 258, 260; R.S.C. vii. 255.

Brockbank, William (1830?–96): b. 1830?; d. Didsbury, 25 Sept. 1896; bur. Friends' Meeting-house, Ashton-on-Mersey. F.L.S. F.G.S. Cultivated Primulas, Saxifrages, Narcissus, &c. Experimented on doubling and colouring flowers. Gard. Chron. 1896, ii. 409.

Bromfeild, William (fl. 1757). 'An account of the English Nightshades, and their effects.' London, 1757. French translation by his son, 1761.

Brown, Robert (1842–95): b. Campster, Caithness, 23 March, 1842; d. Streatham, Surrey, 26 Oct., 1895. Studied at Edinburgh, Leyden, Copenhagen. Ph.D., Rostock. Visited Jan Meyen, Spitzbergen and Greenland, 1861. Botanist of Brit. Columbia Expedition, 1863–6. In Greenland, 1867. 'Florula Discoana,' Trans. Bot. Soc. Ed. ix. 430. 'Manual of Botany,' 1874. Jacks. 367, 53; R.S.C. i. 661; vii. 279; ix. 371; Journ. Bot. 1895, 384. *Lecidea Campsteriana* Lindsay.

Browne, Edward (1644–1708): b. Norwich, 1644; d. Northfleet, Kent, 28 Aug. 1708; bur. Northfleet. M.B., Camb., 1663. M.D., 1670. M.D., Oxon, 1667. F.R.S., 1667. F.R.C.P., 1675. P.R.C.P., 1704. Son of Sir Thomas. Travelled in Europe, 1664–73. 'Travels,' 1685. Dict. Nat. Biog. vii. 42; Munk, i. 375; Wadd. 26. Portr. engr. from one in Buchan Coll.

Buchanan, John (1855–96): b. Nuthill, Perth, 1855; d. British Central Africa, 9 March, 1896. Gardener at Drummond Gardens, Crieff. Agriculturist to Church of Scotland Mission, Blantyre, Nyassaland, 1876. Acting Vice-Consul, Nyassaland, 1888. C.M.G., 1890. Vice-Consul, 1893. Plants at Kew and Brit. Mus. Journ. Bot. 1896, 192; Kew Bulletin, 1896, 148. *Albuca Buchanani* Baker.

Buffham, Thomas Hughes (1840–96): b. Long Sutton, Lincolnshire, 24 Dec. 1840; d. Walthamstow, Essex, 9 Feb. 1896. A.L.S., 1891. Algologist. Contrib. algological papers to Journ. Quekett Microsc. Club. Algæ at Brit. Mus. Journ. Bot. 1896, 170; R.S.C. ix. 395. *Gonimophyllum Buffhami* Batters,

Burnett, Stuart Moubray (1826?–93): b. Kemnay, Aberdeensh., 1826?; d. Old Aberdeen, 23 Jan. 1893; bur. Old Machar Churchyard, Aberdeen. Of Balbithan, Keithhall, Aberdeen. Had a herbarium. Contributed papers (unpublished) to Aberdeen Nat. Hist. Soc. Gard. Chron. 1893, i. 112.

Burton, Esther. *See* HOPKINS.

Cantley, Nathaniel (d. 1887): b. Thurso, Scotland; d. Tasmania, 1887. Kew gardener; Assistant Director, Mauritius Garden; Superintendent, Singapore Gardens, 1880; founded forest department there. *Dracæna Cantleyi* Baker.

Carrington, Benjamin (1827–93): b. Lincoln, 18 Jan. 1827; d. Brighton, 18 Jan. 1893; bur. Carlton Hill Cemetery. M.D., Edin., 1851, F.R.S.E. Hepaticologist. 'Flora of the West Riding' (with L. C. Miall), 1862. 'British Hepaticæ,' 1874–5. Collection of Hepaticæ at Owens Coll., Manchester. Jacks. 530; R.S.C. i. 799; vii. 339; ix. 453; Journ. Bot. 1893, 120. *Radula Carringtonia* Jack.

Carson, Alexander (1850–96): b. Stirling, 1850; d. Fwambo, Central Africa, 28 Feb. 1896. B.Sc., Glasgow, 1883; to Tanganyika, 1888. Sent plants to Kew. Kew Bulletin, 1896, 148. *Gloriosa Carsoni* Baker.

Cattley, William (d. 1832). F.L.S., 1821. Horticulturist. Of Barnet. 'Botanices scientiæ callentissimus.' Patron of Lindley. Had large collection of drawings of plants. 'A new *Psidium*,' Trans. Hort. Soc. iv. 315. Gard. Chron. 1897 (i.), 93; Lindley, 'Digitalis,' pref. *Cattleya* Lindl.

Chandler, Alfred (1804–96): b. Vauxhall, 31 Jan. 1804; d. East Dulwich, London, 10 Nov. 1896. Nurseryman and floral artist. 'Illustrations of Camelliæ,' 1831 (with descriptions by William Beattie Booth). Pritz. 60; Jacks. 126; Journ. Bot. 1897, 32; Gard. Chron. 1896, 628.

Clarke, R. Trevor (1813–97): d. Welton Place, Daventry, 11 April, 1897. Colonel. Horticulturist. Hybridized Cotton. Gard. Chron. 1865, 366; 1872, 799; Garden, 1897, i. 308.

Clarke, —, Rev. (fl. 1729–34). Collected in Virginia (1729), Carolina, Antigua, Montserrat (1734), and Bermuda. Plants in Herb. Sloane, lx. & lxxxii. 240, 296, 297, 318.

Cleghorn, Hugh Francis Clarke (1820–95): b. Madras, 9 Aug. 1820; d. Stravithie, Fife, 19 May, 1895. M.D., Edin., 1841. LL.D., St. Andrews, 1868. F.B.S.E., 1837; Pres., 1868. F.L.S., 1851. Prof. Bot. Madras Univ., 1852. Conservator of Forests, Madras, 1856; Inspector-General, 1867; Glasgow, 1869. 'Hortus Madraspatensis,' 1853. 'Forests and Gardens of South India,' 1861. Index to Wight's Icones, Madras, 1856. Pritz. 63; Jacks. 532; R.S.C. i. 948; vii. 403; Journ. Bot. 1895, 256; Trans. Bot. Soc. Ed. xx. 439, with bibliog.; Pharm. Journ. 1894–5, 1085. *Cleghornia* Wight = *Baissea*.

Crewe, Rev. Henry Harpur. *See* HARPUR-CREWE.

Crotch, Rev. William Robert (1799–1877): b. Oxford, 1799; d. Catherington, Hants, 8 May, 1877. M.A., Oxon, 1826.

Vicar of Catherington, 1872. Master of Grammar School, Taunton, 1854. Memb. Bot. Exch. Club, 1866. Somerset Fungi in Proc. Som. Archæol. Soc. v. (1854). Helped Leighton (Fl. Shropsh.). R.S.C. ii. 99; Alumn. Oxon.

Cunnack, James (1831–86): b. Helston, Cornwall, 27 Dec. 1831; d. Helston, 11 May, 1886; bur. Helston Cemetery. Bookseller, of Helston. Had a large herbarium. Correspondent of Watson. Active Member of Bot. Exchange Club. Found *Hypericum undulatum*. Journ. Bot. 1891, 98; Top. Bot. 542.

Dale, Francis (fl. 1730): b. Hoxton? Relative of Samuel Dale. Travelled in East and West Indies, and sent plants to S. Dale from Bahamas. Journ. Bot. 1883, 227.

Dale, Thomas (fl. 1700–30). M.D., ? Leyden, 1723. Prob. nephew of Samuel Dale. Sec. Botanical Society (London), 1726, and afterwards of Charlestown, S. Carolina. 'De Pareira brava,' Leyden, 1723. Pritz. 75; Jacks. 200; Dict. Nat. Biog. xiii. 386; Munk, ii. 362.

Dalhousie, Lady. *See* RAMSAY, CHRISTINA.

Darwall, Rev. Lester or **Leicester** (1813–97): d. Tenby, Pembrokesh., 22 July, 1897. M.A., Camb., 1838. Incumbent of Criggion. Had a salicetum. Contributed to Leefe's 'Salictum Exsiccatum.' Sent *Salix cuspidata* to Borrer for E. B. S. 2961. Alumn. Oxon.

Davis, John Ford (1773–1864): b. Bath, 1773; d. Bath, 1 Jan. 1864. M.D., Edinb., 1797. L.R.C.P., 1808. Physician to Bath Hospital, 1817–34. 'Botany of Bath' in 'Historical . . . Account of Bath,' 1802. Babington, 'Flora Bathon.' pref. v. Munk, iii. 67–8; Dict. Nat. Biog. xiv. 168; Boasc.

De Alwis, Harmanis (d. 1894): b. Ceylon; d. Ceylon, 10 June, 1894. At Ceylon Bot. Gardens, 1818–94. Assisted Moon in 'Cat. Ceylon Plants' (1824). Draughtsman to Gardens, 1823–61; large series of his drawings there. Drew some plates for Wight's 'Icones.' Helped Thwaites with 'Enum. Pl. Zeylaniæ.' Journ. Bot. 1894, 255. *Alwisia* Lindl. = *Eria*. *Tæniophyllum Alwisii* Lindl.

De Crespigny, Eyre Champion (1891–95): b. Vevey, Switzerland, 5 May, 1821; d. Beckenham, Kent, 15 Feb. 1895. M.D., Heidelberg. In India, 1845–62. Conservator of Forests and Superintendent Bot. Gard. Dapsoria, near Poonah, 1859. 'New London Flora,' 1877. Had a herbarium. Jacks. 256: Journ. Bot. 1895, 127.

De Tabley, Lord. *See* WARREN, JOHN BYRNE LEICESTER.

Dickson, Francis (1793–1866): b. Edinburgh, 25 Dec. 1793; d. Chester, 3 March, 1866; bur. Chester Cemetery. Seedsman at nurseryman at Chester, 1819. Correspondent of Loudon and T. A. Knight. Corr. Memb. Roy. Hort. Soc., 1825. Journ. Hort. x. (1866), 241.

Donovan, Edward. *See* O'DONOVAN.

Drummond-Hay, Henry Maurice, *né* **Drummond** (1814–96): b. 1814; d. Seggieden, Perth, 3 Jan. 1896; bur. Kinfauns, Perth. Colonel. Of Seggieden, Perth. Hon. Curator, Perth Museum. Contrib. bot. papers to Scottish Naturalist, 1872–80. Ornithologist. R.S.C. vii. 927; x. 166; Journ. Bot. 1896, 133; Ann. Scott. Nat. Hist. 1896, 73, with portr. *Rhinanthus Crista-galli* var. *Drummond-Hayi* F. B. White.

Duncannon, Thomas (fl. 1822–26). Gardener in Royal Bot. Garden, Edinburgh. Drew pl. at Kew for W. T. Aiton, 1822–6. 'Garden,' 24 Jan. 1880, 75.

Dymock, William (d. 1892): d. Bombay, 29 April, 1892. Bombay Medical Staff, 1859. Surgeon-Major. Prof. Mat. Medica, Grant College, Bombay. Hanbury medallist, 1887. 'Materia Medica of Western India,' 1883; ed. 2, 1885. 'Pharmacographia Indica.' Pharm. Journ. 3rd ser. xxii. 993.

(To be continued.)

SHORT NOTES.

Chenopodium glomerulosum Rchb. — My attention was first drawn to a strange goosefoot growing abundantly on waste heaps at Twerton, N. Somerset, about two years ago. The same plant has been seen lately also at Tewkesbury; and, like *C. opulifolium*, which now seems always with us on waste heaps in the west, it is probable that this new form, when attention has been directed to it, will be found to occur more frequently than at present appears to be the case. The reflection should be borne in mind that a plant found growing solely in waste ground and on rubbish-heaps need not necessarily be an alien; for several indigenous species whose status is not questioned are only met with in similar situations. *C. glomerulosum* is undoubtedly a segregate of the *album* group, to which a careful comparison of fruit and seed shows a very close affinity. But the habit, foliage, and inflorescence are characteristic. Usually a bushy, spreading plant of 2–2½ ft., the lower branches are often longer than the central axis. Stem stout, reddish, striate. Foliage dull, dark green. Leaves long-stalked, mostly entire or but slightly angled, elliptic in outline, blunt; a few irregularly angled and toothed. Inflorescence of densely aggregated glomerules, in shortly branched spiciform panicles; leafy in bud, becoming more naked in fruit. The name has been confirmed by Prof. Sagorski. — James W. White.

Tortula intermedia Berk. in Leicestershire.—Whilst botanizing at Birstall the other afternoon, I came across a considerable quantity of *Tortula intermedia* growing on a wall in that village. There does not appear to be any previous note for this moss in Leicestershire. It occurs in surrounding counties, and it may probably have been passed over in Leicestershire for *T. ruralis*, which it superficially resembles. Under the microscope it may be distinguished from the latter by the smaller areolation, the leaf-margin plane above, and the less denticulate arista.—A. B. Jackson.

Scottish Localities for Euphrasia foulaensis Towns.—I lately looked through the Eyebrights of Mr. F. J. Hanbury's collection and of the Boswell-Syme Herbarium, and noticed among them various specimens which correspond with one or other of the northern forms recently so named by Prof. Wettstein for Mr. Shoolbred and myself; there are also one or two gatherings of mine which apparently belong here. Mid-Perth (v.-c. 88): Ben Lawers, August, 1887 !, above 3000 ft.; these just match some of our Melvich plants. Small and immature specimens from near the summit of Am Binnein (Ben More), between 3500 and 3700 ft., *Hanbury & Marshall*, July, 1889, are probably the same thing. S. Aberdeen (v.-c. 92): Near the Falls of Corriemulzie, Braemar (very characteristic), *Fox & Hanbury*, July, 1885. The Derry, Braemar (mixed with *E. gracilis* Fries and *E. curta* Fries), *Hanbury*, July, 1886. W. Sutherland (v.-c. 108): Between Durness and Rhiconich, *Fox & Hanbury*, July, 1885. Caithness (v.-c. 109): Cliffs at Downreay, *Fox & Hanbury*, July, 1885. Orkney (v.-c. 111): Swanbister, *W. Irvine Fortescue* in *Herb. Boswell-Syme*—one dwarf plant, like the mainland form of exposed grassy cliffs, among a lot of *E. borealis* Townsend. Moul Head, Deerness (the same form), *W. Irvine Fortescue* in *Herb. Hanbury*. I suspect that *E. officinalis* var. *maritima* Hooker comes under *E. foulaensis;* but there appear to be no authentic specimens in the General Herbarium at Kew, nor yet in the British Herbarium at South Kensington. There are examples in Herb. Hanbury of a beautiful plant from cliffs at Downreay, Caithness, gathered in July, 1888 (associated with *E. foulaensis*), which I think may be *E. foulaensis* × *latifolia*. In habit these closely approach *E. latifolia* Pursh, but are much less hairy, with small bright violet-purple blossoms, the corolla-tube being included. Mr. Hanbury tells me that they occurred over nearly a mile, mostly in ones and twos—a fact which rather favours the suggested theory of their origin.—Edward S. Marshall.

NOTICES OF BOOKS.

P. Bubani Flora Pyrenaea *per Ordines Naturales gradatim digesta.* Opus posthumum editum curante O. Penzig. Mediolani, Hoeplius edidit MDCCCIIIC. Vol. I. pp. iii. 551. 8vo.

This work, upon which Bubani had been engaged during the chief and best part of his life, was practically ready for the press at his death in 1888. Prof. Penzig in his preface explains that, from various circumstances, it has not been possible to publish it until now. His share in the work is limited to certain corrections, bibliographical additions, &c., the book being in the main produced as it was left by its author in about 3000 folio pages of manuscript.

"Whatever may be thought of the author's views of nomenclature," says the preface, "every one must admire the vast erudition, the skill, and the scrupulous care" which Bubani has brought to bear upon his Flora. It is indeed widely different in almost every particular from the average work of the kind. It is written in Latin throughout; the synonymy is of the most elaborate description; and the notes upon each species show an acquaintance with botanical literature, both ancient and recent, which can hardly be exceeded. The space devoted to localities is but small, but his intimate acquaintance with the country enables the author to express succinctly and with precision the distribution of the species; he usually, however, gives the exact localities of his own gatherings, with dates. He divides the Pyrenees into three botanical regions, the oceanic, the mediterranean, and the alpine, and in his preface discusses the comparative richness and other peculiarities of each. The De Candollean system of classification is mainly followed, though in reversed order, beginning with Gymnosperms, and then taking the Monochlamydeæ of Angiosperms; in this volume the Corollifloræ are included only from *Plumbagineæ* to *Asclepiadaceæ; Rhamnaceæ* (of which *Celastrineæ* and *Aquifoliaceæ* are considered tribes) is interposed between *Oleaceæ* and *Acanthaceæ*. In the forty-two natural orders included there are 177 genera and 642 species; doubtful species and those which he does not regard as properly Pyrenean, though admitted by some authors, he places at the end of each family or genus, and they are not counted.

In the acceptation of genera, Bubani regards habit and general aspect rather than technical characters. As the plan of the book was formed many years ago, the first draft of it having been finished nearly half a century before its publication, it does not deal with the highly critical species of certain modern botanists; he defines a species as that in which concur distinct tangible and constant characters, and carries out his idea on a moderate scale, as can be judged when a comparison is made with Gautier's recently published catalogue of the flora of the eastern Pyrenees, which is only a part of the area covered by Bubani's Flora; in Gautier's catalogue there is an aggregate of 574 species for the same portion of the vegetable kingdom.

A leading feature in the work is the evidence of his research into the older books, and of his appreciation of the labours of the fathers of botany. His lucubrations have resulted in very curious and astounding developments; our author, not content with citing the older botanists, such as Dioscorides, Mattioli, Theophrastus, Lonitzer, &c., and referring to the Bible, Homer, Virgil, &c., under many of the species, proceeds to use the names given by some of them, and relegates to synonymy Linnean and other names which have long been adopted by botanists. While following the method of binominal nomenclature, he combats the idea that Linnæus invented this method, and shows that such names were given by several of the ante-Linnean writers, who, he claims, gave them in many instances not casually, but by set purpose. He exhibits a very limited admiration for Linnæus and his ways, and broadly states that the *Species Plantarum* of that master was a very bad book, and full of mistakes; and he complains that Linnæus in many cases unnecessarily and for the worse altered the names of Tournefort, Bauhin, and other of his predecessors, and that, while infringing the rules which he himself had laid down, he substituted names of his own, inaccurate or wrongly chosen, both for genera and species; for example, *Cataria* of Tournefort was called *Nepeta* by Linnæus, although *Nepeta* was declared by Dioscorides to be synonymous with *Mentha*, and the true *Nepeta* of Pliny is thought to be a *Melissa* (*Calamintha*); Bubani contends that therefore *Nepeta* was erroneously used by Linnæus, and *N. Cataria* L. he accordingly calls *C. tomentosa* Gilib. The *Rhabarbarum* of Ammann and Tournefort was changed by Linnæus into *Rheum;* and other such innovations are instanced and objected to.

Bubani exercised a critical scrutiny into the correct application of ancient names, and does not scruple to discard them, however much sanctioned by modern adoption and usage, whenever he finds that errors are involved in using them. Thus he explains that no *Glaux* of Dioscorides or of any of the ancients, except Dodoëns, was the plant now known to us by that name, and he therefore thought it a good opportunity to change the name into *Vroedea*, and in this way to avoid confusion and to commemorate John de Vroede, a Belgian correspondent of Dodoëns. But he does not use or even cite for the genus the synonym *Glaucoides* Rupp. Fl. Jen. 21 (1718), non Micheli (1729).

The following passages from a letter addressed by Dillenius to Linnæus are transcribed in support of the author's action:—"I think the names of the ancients ought not rashly and promiscuously to be transferred to our new genera, or to those of the new world. The day may possibly come when the plants of Theophrastus and Dioscorides may be ascertained, and till this happens, we had better leave their names as we find them." "I do not, like Burman, blame you for introducing new names, but for the bad application of old ones." He shows that many excellent botanists have in former times changed names for good and sufficient reasons, and he claims the same liberty for himself.

For the names of genera he refers with approval to the opinion of Cassini that in general meaningless names or those which do not indicate any character are the best, though he accepts diminutive names derived from a true comparison with well-known plants, and he has constructed such a name for *Cicendia*, which he deals with as follows: he says that *Cicendia* Adans. is one of the synonyms of *Gentiana* Tournef., and that *Exacum* L., which some botanists use, is a synonym of *Erythræa;* he therefore substitutes for it his new name *Cicendiola*. He also dismisses the name *Erythræa* on the ground that it comprises some species with white flowers, and he calls it *Libadion*, a name which he finds used by Pliny, but which is unknown to modern science. For species he thinks that names should be expressive, and he selects for them the best rather than the oldest names, and does not countenance the principle of De Candolle and of many later authors in prohibiting the alteration of the trivial name of a plant whenever the species is transferred from one genus to another. Bubani forcibly urges against such an unnecessary and comparatively modern restriction—and many British authors would agree with him—that when the genus, which is the principal part of the name of a species is changed, a new thing is done and the name gone, and therefore the trivial part, which is quite secondary and subservient, can without any difficulty be reformed; and he wisely points out that trivial names are frequently given with special reference to their generic allocation, and that such names when removed from the genus cease to be applicable, and it may not be possible to retain them without involving absurdity.

There is one new species described—*Onosma elegans;* not the plant so named by C. Koch, which is synonymous with *O. sericeum* Willd.

W. P. Hiern.

Elementary Botany. By Percy Groom, M.A., F.L.S. Crown 8vo, pp. x, 252; tt. 275. London: G. Bell & Sons. 1898. Price 3s. 6d.

Botany without a microscope is the motto of this latest addition to the long list of elementary text-books. "Considerable experience as examiner in Botany as taught in schools" has convinced the author that "comparatively few learners have the advantage of seeing specimens with the aid of a compound microscope." There is unfortunately some truth in this, though we are inclined to think that Mr. Groom underestimates the number of those who enjoy the advantage. It is an age of examinations, and teachers are rapidly finding out that success in examinations can only be gained by the use of proper appliances in connection with their teaching. The superficial teaching of science was a result of superficial knowledge on the part of the teacher, but happily there are technical institutes and similar foundations which admit pure science into their curriculum, and it is quite easy for elementary teachers to acquire in their spare evenings something more than a mere smattering of their subject. Within the last month we have met no less than three teachers who, having realized the necessity of some use of the microscope in teaching botany, have given up one evening a week to remedy the deficiency. We believe that Mr. Groom writes for a rapidly diminishing number, and cannot agree with him when he further remarks: "In commencing the study of Botany a compound microscope is absolutely needless, and in the case of young beginners does more harm than good." Perhaps he has had more experience in examining beginners than in teaching them.

This is one of the clearest and best of elementary text-books we have seen, and we have seen a good many; but in looking through it we feel how often a microscope would help to make clear certain points. On p. 3, one of the chief characteristics of the root, the protection of its tip by a root-cap, is relegated to a footnote, as it "can only be properly seen by the aid of a compound microscope." It can easily be seen in duckweed with a lens, and demonstrated in most roots without any difficulty with a low power of a cheap microscope, as also can the endogenous origin of the root-branches, and the reason of their arrangement in regular longitudinal rows, both of which points are insufficiently explained. Later in the book is an excellent short account of pollination, and the differences in structural mechanism between wind- and insect-pollinated flowers. A sight of the pollen and stigma of typical examples of each by aid of the microscope would forcibly drive home these differences.

But nowadays a text-book plays a subordinate, though an important, part in the study of science. The teacher must always supplement, and generally finds it necessary to correct, thereby often seriously bewildering the student, and causing him to lose all faith in what should be a useful guide. If he adopts Mr. Groom's work, he will find the second function unnecessary. The book deals entirely with the seed-plants, and is divided into three parts—General Morphology, Classification, and Physiology. We congratulate the author on the abundance and excellence of the figures; a great many of them are new. Especially helpful are the large clear floral dissections and diagrams in the systematic portion; our only fear is lest the student should think it unnecessary to refer to the flower; the teacher must insist with the author (p. 2) that he "have before him a specimen of the plant described," and "constantly examine and refer to it." The pictures of simple apparatus for illustrating points in physiology will enable the learner to repeat the experiments. The glossary at the end of the book will be useful; as may also the forty-eight-paged catalogue of Messrs. Bell's educational works, though personally we should much prefer not having them bound up with the book. Finally, to assure him of our goodwill towards his book, we will tell Mr. Groom that we have already recommended it to several students.

A. B. Rendle.

*ARTICLES IN JOURNALS.**

Annals of Botany (March). — D. H. Campbell, 'Development of flower and embryo in *Lilæa*' (3 pl.).—W. & G. S. West, 'Observations on the Conjugatæ' (2 pl.). — H. M. Ward, 'A Violet Bacillus from the Thames' (1 pl.).—A. H. Church, 'Polymorphy of *Cutleria multifida*' (3 pl.). — M. Dawson, 'On the structure of an ancient paper.'

Bot. Centralblatt (Nos. 9, 10).—F. Ludwig, 'Die pflanzenlichen Variationscurven und die Gauss'che Wahrscheinlichkeitscurve.'—(No. 9). A. Weberbauer, 'Zur Anatomie der Kapselfrüchte.'—(No. 10). E. H. L. Krause, 'Floristische Notizen: Gräser.'—(Nos. 11, 12). F. G. Kohl, 'Ueber das Chlorophyll und seine Derivate.' — L. Kny, 'Vermögen Chlorophyllkörner im Lichte Sauerstoff aus zuscheiden?'

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* The dates assigned to the numbers are those which appear on their covers or title-pages, but it must not always be inferred that this is the actual date of publication.

Bot. Gazette (15 Feb.).—J. M. Coulter, 'Life-history of *Ranunculus*' (4 pl.).—J. E. Tilden, 'W. American Thermal Algæ' (3 pl.).—J. W. Toumey, 'The Tree Opuntias of the U. S.' — C. Chamberlain, 'Winter characters of certain sporangia' (1 pl.).

Bull. de l'Herb. Boissier (Feb.). — C. Müller, 'Bryologia Serræ Itatiatæ' (cont.). — R. Chodat, 'Études de biologie lacustre.'—(Feb. & March). H. Christ, 'Filices Insularum Philippinarum' (3 pl.).—(March). H. Hallier, 'Neue und bemerkenswerte Pflanzen aus den Malaiisch-papuanischen Inselmeer.' — T. de Heldreich, 'Flore de l'Ile d'Égine.'—A. Chabert, 'Sur quelques Renoncules.'

Bull. Torrey Bot. Club (12 Feb.).—D. T. MacDougal, 'Physiology of Tendrils.' — Id., 'The Mycorhizæ of *Aplectrum*.' — T. F. Allen, 'Japanese Characeæ.'—G. V. Nash, 'American Grasses' (*Blepharoneuron*, gen. nov. = *Vilfa tricholepis* Torr.).—F. E. Lloyd, *Pseudotsuga mucronata* (1 pl.).— A. Le Jolis & M. A. Howe, 'Porella once more.' — E. P. Bicknell, *Savastana Nashii*, *Chætochloa versicolor*, spp. nn. (2 pl.).—G. N. Best, '*Fabroleskea*, a new genus of Mosses.'

Erythea (17 Feb.). — *Rumex densiflorus* Osterhout, sp. n. — A. Eastwood, 'Ferns of the Yosemite.'

Gardeners' Chronicle (5 March). — W. Roberts, 'Early Herbals.' —(19 March). *Isachne obscurans* Woodrow, *Cirsium candidissimum* Dammer, spp. nn.—(26 March). H. N. Ridley, *Livistona Woodfordi*, sp. n.

Journal de Botanique ("16 Déc. 1897"; received middle of March). — P. Parmentier, 'L'espèce végétale en classification.'—E. Malinvaud, 'Propriété scientifique.'

Oesterr. Bot. Zeitschrift (March). — G. R. v. Beck, 'Die Sporen von *Microchæte tenera* und deren Keimung.'—E. Hackel, *Odontelytrum*, gen. nov. (Paniceæ).— S. Murbeck, *Alectorolophus asperulus* (concl.).—A. Nestler, 'Die Schleimzellen der Laubblätter der Malvaceen' (1 pl.).—F. Pfeiffer & R. v. Wellheim, 'Zur Fixirung und Präparation der Süsswasseralgen' (concl.).—A. v. Degen, *Alyssum Dörfleri*, sp. n.—M. Schulz, 'Die Orchideen Deutschlands,' &c.

BOOK-NOTES, NEWS, &c.

By the publication of part xviii. of his *British Moss-Flora* (London: 303, Clapham Road. Jan. 1898. Pp. 37–64; plates 91–96. Price 6s.) Dr. Braithwaite has advanced another stage, and he has traversed some rough and difficult country on the way. The result of his recent operations is that he has nearly completed his treatment of the genus *Amblystegium*. This genus, as amplified by Lindberg and others and adopted by Dr. Braithwaite, contains about three times the number of species that were allotted to it originally by Bruch and Schimper. The additions consist chiefly of some Hypnaceous subgenera of more or less aquatic habit which exhibit a relationship to *Amblystegium riparium*. There are in all forty-two species; and these are grouped into six sections, of which two—*Euamblystegium* and *Campyliadelphus*, containing thirteen and five species respectively—were included in part xvii. In the present part comes the extremely difficult section *Drepanocladus* or *Harpidium*, to which Dr. Braithwaite attaches the anomalous *Thuidium decipiens* De Not. This section contains twelve species. Then follow *Scorpidium* with one species, *Hygrohypnum* or *Limnobium* with six, and *Calliergon* with five, three of which have failed to secure accommodation in part xviii. Dr. Braithwaite is much to be congratulated upon the completion of one of the most troublesome portions of his undertaking.—A. G.

At the meeting of the Linnean Society on Feb. 3rd, Mr. W. C. Worsdell read a paper on "The Comparative Anatomy of certain Genera of the *Cycadaceæ*." The chief points touched upon were:—In *Cycas*, the conduplicate vernation and arrangement of the bundles in the fleshy hypogæal cotyledons, the secondary extrafascicular rings, the concentric cortical strands, and, in one species, the peculiar concentric structure of the leaf-traces, in the stem, and in the hypocotyl some curious concentric strands running obliquely out from the cylinder, and, in a small seedling, the secondary vascular cylinders lying outside the normal stele; in the seedling of *Stangeria paradoxa* the small primary concentric bundles in the stalk common to the two cotyledons, which both higher up and lower down become collateral, and in the adult stem the occurrence of a secondary concentric strand in the periphery of the cortex, which appeared to be the remnant of a once normal system of nude strands; and in *Ceratozamia mexicana* the vertical succession through the pith of a large stem of effete peduncular cylinders, the peduncles which successively terminate the stem being in turn pushed to one side and their basal region enclosed by a lateral shoot which continues the main vegetative axis. In conclusion the author endeavoured to show that certain characters in the vegetative structure of these plants showed them to be nearly allied to, or descended from, certain fossil fern-like plants, notably the Medulloseæ, and these characters were: the extrafascicular zones in the stem of *Cycas*, which really represent the outer portion of the flattened concentric strands in the stem of the Medulloseæ, the inner portion of which has died out; and all the various concentric structures above-mentioned. For the type of structure prevailing in the ancestors of the Cycads would have been the concentric, whereas in their descendants it is the collateral. The significant outcome of this study is to form, in the vegetative characters of these plants, a connecting link, over and above that already afforded by the discovery of spermatozoids in *Cycas* and *Ginkgo*, between "flowering" and "flowerless" plants.

At the meeting of the Linnean Society on Feb. 17th, Mr. F. N. Williams, F.L.S., read a paper on *Arenaria*, one of the larger genera of *Caryophyllaceæ*, which now includes a considerable number of species. *Alsine* and others, usually included as sections of the genus, he thought should be regarded as distinct genera; *Alsine* and *Arenaria* being distinguished by the same cardinal character which separates *Lychnis* from *Silene*. The genus under revision includes species (of which 168 are enumerated) distributed chiefly throughout the north temperate zone, though in the New World a few occur in South America. A few species which extend toward the Tropics occur at considerable elevations on mountain-ranges, reaching, for instance, 19,000 ft. in the Himalayas of West Tibet. In this revision, for the formation of primary groups, the two associated characters relied on are the number of teeth formed by dehiscence of the ripe capsule, and the structure of the disk. An examination of several series of specimens, especially of those of the better known forms growing *in situ*, shows these two characters to be fairly constant, and suitable for the definition of primary groups, although in habit and aspect species of *Alsine* are not readily distinguished from those of *Arenaria*. The author's descriptions are confined to species recognized during the last fifty years (from 1848 to 1897 inclusive), the others being cited in their proper place by name and references.

At the meeting of the Linnean Society on March 3rd, Mr. G. Claridge Druce read a paper on the occurrence of *Carex helvola* Blytt in Britain, in which he gave an account of his discovery of this plant on Ben Lawers, Perthshire, in August, 1897. He found it growing in some abundance at an elevation of about 3200 ft. Prof. Blytt and Dr. Christ, to whom specimens had been submitted, both agreed in naming it *C. helvola*, which by many botanists is considered to be a hybrid. Prof. Blytt says that it grows with *C. canescens* and *approximata* (*lagopina*), but he has never found ripe fruit. Dr. Christ says: "Il me semble d'être une ancienne hybride fixe et plus ou moins stable." Mr. Druce could readily believe that *C. helvola* was a hybrid of which *C. canescens* was one parent, but he had more difficulty in stating definitely the name of the other. From the close resemblance borne by *C. helvola* to *C. Zahnii* (an acknowledged hybrid of *C. canescens*, in one of its forms, with *C. approximata*), this combination might well be the origin of the Ben Lawers plant, but against that was the fact that the presence of *C. approximata* in the Breadalbanes had never been proved. *C. echinata*, on the contrary, was plentiful there, but Mr. Druce could see no positive evidence of the occurrence of that species in the foliage or inflorescence. He would have expected the offspring of two plants with nerved perigynia to have exhibited that character even in young specimens; as is shown in *C. pseudohelvola*, an acknowledged hybrid of *C. canescens* and *norvegica*. The foliage, too, was slightly glaucous, a character not possessed by *C. echinata*. Although the Ben Lawers plant was less luxuriant than Blytt's Norwegian specimens, Mr. Druce was unable to separate it specifically from that plant.

A second instalment of the Welwitsch Catalogue has just made its appearance, in which Mr. Hiern continues the enumeration of the phanerogams to the end of *Rubiaceæ*. Four new genera and a large number of new species are described in this part.

The second volume, which is in an advanced state of preparation, will contain the Monocotyledons, by Mr. Rendle; the Vascular Cryptogams, by Mr. Carruthers; the Mosses, by Mr. Gepp; the Hepaticæ, by Prof. Stephani; the Marine Algæ, by Miss Barton; the Freshwater Algæ, by Messrs. W. & G. S. West; the Fungi, by Miss Smith; and the Lichens, by Prof. Wainio.

The *Annales des Sciences Naturelles* must be added to the number —happily decreasing—of those periodicals which are imperfectly or incorrectly dated. The last volume (iv.), both on title-page and wrapper, bears the date 1896, but at the foot of the front page of the latter we read: "Ce cahier a été publié en novembre 1897"—a fact of which no indication is given in the volume itself, and of which, therefore, when bound, it will contain no record, unless the wrapper be retained. In the face of its notorious inaccuracy, would it not be well to discontinue the announcement which appears on each wrapper—"Les *Annales* paraissant par cahiers mensuels"? The *Journal of the Linnean Society* exhibits in a less degree the same discrepancy between promise and performance; thus, on the cover of the last number we read that "papers read in May and June are published on 1st November." Yet this number bears date Dec. 2, and contains only one paper, which was read on March 18 and June 17! The cover of the *Journal de Botanique* dated Feb. 1 announced: "Le numéro du 16 Décembre 1897 paraîtra prochainement"; it came to hand about the middle of March, duly dated "16 Décembre"! It would seem that the bad example so long set by the Kew *Bulletin* is finding numerous imitators.

We are glad to announce that the *Flora of Kent*, under the joint authorship of Mr. F. J. Hanbury and the Rev. E. S. Marshall, is practically ready for press, and that a large portion of it is already in the printer's hands. A new part of Mr. Hanbury's *British Hieracia* has just been issued.

M. John Briquet has issued a *Monographie des Buplèvres des Alpes-Maritimes* (Bâle: Georg, Nov. 1897) which is evidently a very careful study of the twelve species of *Bupleurum* found in the region mentioned.

We regret to record the death of our contributor Mr. Thomas Kirk, of Wellington, New Zealand, of whom we hope to publish a fuller notice.

Mrs. Earle's *Potpourri from a Surrey Garden* (Smith, Elder & Co.; price 6s.) contains much miscellaneous chat on all kinds of subjects, from children to cookery, but is remarkable among the books of its class for its very interesting and appreciative notices of botanical artists and their work. Mrs. Earle's own collection of the less recent and (artistically at any rate) more valuable illustrated literature is evidently by no means inconsiderable, and she has supplemented her knowledge by frequent visits to the Botanical Department of the Natural History Museum, where she has been able to study at leisure the work, both published and unpublished, of the best botanical draughtsmen. We know of no book which contains a more attractive account of these than this of Mrs. Earle's, and we hope she will pursue her researches and publish the results —perhaps apart from the domesticities which form a considerable percentage of this potpourri. There is, it seems to us, room for a book of this kind, but, should Mrs. Earle act on this suggestion, we would advise her to submit her proofs to some botanical friend, in order that certain slips which disfigure the present volume may be avoided in the future.

Mrs. Rowan, to whose drawings of Australian plants we referred in this Journal for 1896 (p. 239), has published a book called *A Flower-Hunter in Queensland and New Zealand.* It can hardly be held to justify its title, for there is little about flowers beyond some rather gushing remarks in the preface as to the author's "love for the *flora* of Australia, at once so unique and so fascinating," and about "the delight of finding rare and even unknown specimens" (*sic*)—"those specimens hitherto unknown were named by the late Sir Frederick Müller." Only one example of Mrs. Rowan's really clever coloured drawings of plants is reproduced: this is said to be "a specimen of Cochliospermam" (*sic*). As a book of travel the volume is fairly interesting, but as far as plants are concerned it is not enlightening. Nor do we learn anything as to the occurrence of certain unexpected additions to the Australian flora, to which we drew attention in our note already referred to.

We have received the first number (Feb.) of *The Cactus Journal*, a new monthly, which is not to be limited in accordance with its title, but will "exclusively deal with Cacti, Euphorbias, Stapelias, Agaves, Aloes, Echeverias, Mesembryanthemums, and other succulent plants." Among other things it will contain "a Botanical List of all known Cacti and Succulent Plants, with their synonyms, native countries, discoveries, and other particulars, and a portion will be given in each number, until every genera [*sic*], species, and variety known to botanists and horticulturists has been fully exhausted." Judging from the instalment of this list in the present number, it will hardly merit the term botanical: it begins thus—

> "Cereus Acutangulus, Brazil, Hort. Berol.
> "C. Alacroportanus, Brazil, Pfeiff.
> "C. *Albispinus* (s. Pilocereus Albispinus and Landbeckii), Chili, Salm.
> "C. Atroperpureus [*sic*], West Indies.
> "C. Azurens [*sic*], Chili, Parm."

The editor says: "Those in italics should be classed with the genera in brackets, in our opinion"; but as he does not give his name, it is not easy to determine whether his views on classification are more worthy of consideration than his practice in spelling, which throughout the number is hardly in accordance with precedent. "Professor Luis Murillo," who, we gather from his advertisement on the cover, is a Vera Cruz dealer in cacti, contributes an exciting account of a night adventure in Mexico, when he was nearly suffocated by the "queer, and to a certain extent agreeable odour" of "a gigantic *Cereus triangularis* in fantastical shapes and shade" which "surrounded on every side" the house where he was sleeping; its "innumerable magnificent flowers of pure spotless white bedewed with watery pearls twinkled under the moon's gaze as so many bright diamonds." Mr. William Watson, of Kew, contributes "a note of welcome."

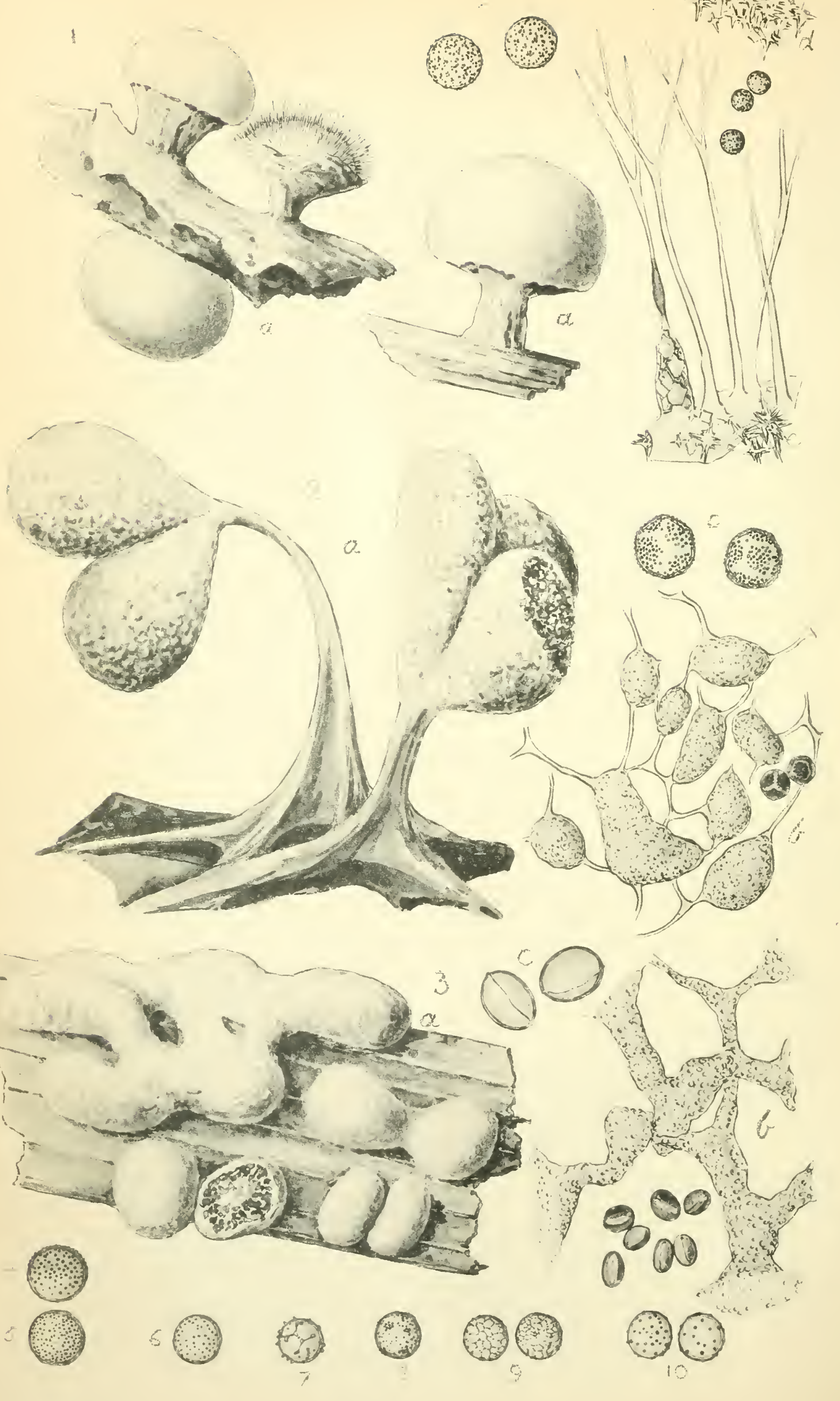
The Committee of the Ceylon Planters' Association have resolved to perpetuate the memory of the late Director of the Royal Botanic Gardens at Peradeniya (Dr. Trimen) by the erection of a cenotaph at the Gardens in recognition of his valued services to the planting community, as well as to the colony generally, in his special departments of botanical and scientific research. This will probably take the form of a tablet in a building erected as a memorial to Thwaites, and containing a memorial tablet to him.

Sir George King retired on Feb. 28th from the posts of Superintendent of the Royal Botanic Garden, Calcutta, and of Director of Cinchona Cultivation in Bengal. There is no need for us to remind our readers of the excellent work which Sir George has done in both these capacities; and it is a satisfaction to know that he has been succeeded by Dr. Prain, who has for many years assisted Sir George in his work, and of whose thorough competence for the posts there can be no question.

Dr. Otto Stapf has been elected an Associate of the Linnean Society. We are quite sure that he is well worthy of the honour conferred, but we are surprised that the Council should be unable to find any British subject, either at home or abroad, who has sufficient claims to this distinction.

We have received a list of the *Flowering Plants of the Bromley District*, which the Rev. J. J. Scargill has edited for the Bromley Naturalists' Society. It seems very carefully done, and contains 696 species, all of which, with the exception of about twenty-five, have been observed within five miles of Bromley townhall. There are, of course, a considerable number of introductions—it is curious to note among them three balsams (*Impatiens Noli-tangere*, *I. biflora*, and *I. Roylei*), all of which are entered as having been found by the Ravensbourne on the Cator estate. The absence of authorities for the Latin names gives the list a somewhat slipshod look, and is not compensated for by the addition of an "English name" to every species, even when introduced. Some of these would, we think, puzzle the most strenuous advocate of vernacular names to identify —*e.g.* the "Lance-leaved Turnip": this is assigned to *Bunias orientalis*, which is stated to be well established in the neighbourhood of Bromley.

Mr. G. C. Druce asks any member of the Botanical Exchange Club who may have recently received in his parcel a sheet containing more than one specimen of *Potamogeton fluitans* to forward the others to Mr. A. Fryer, Chatteris, Cambridgeshire, as they were meant for him.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G. Lister pinx.

Mycetozoa.

NOTES ON MYCETOZOA.

By Arthur Lister, F.L.S.

(Plate 386.)

Physarum didermoides Rost. var. lividum, n. var. (Pl. 386, fig. 4). In searching for the various forms of Mycetozoa, we have until recently confined our attention very much to old stumps and fallen leaves in woods and gardens; during the last year, however, Mr. Saunders, of Luton, and Mr. Crouch, of Pulloxhill, Beds, have found that straw-heaps that have lain long undisturbed yield species of the genera *Physarum* and *Didymium*, often in vast abundance, and of special interest. In April, 1897, Mr. Saunders sent me a specimen presenting unusual characters, which he had gathered in a deserted stackyard on an exposed hill-top on the Dunstable Downs. A few days later my daughter and I visited the spot in his company. we found the wet straw beneath the dry superficial layer covered with the sporangia of Mycetozoa, principally of *Didymium effusum* Link, and *D. difforme* Duby, but also with a large growth of the form we specially came in search of. It is a *Physarum* with the following characters:—Plasmodium white; sporangia subglobose or ovoid on a broad base, 0·5 to 0·6 mm. diam., sessile, crowded, grey, and somewhat rugose from deposits of lime, or purplish-iridescent from the absence of lime, exceptionally white with a densely calcareous wall; they are either seated directly on the straw, or on a thick white hypothallus devoid of refuse matter, and sometimes extending beyond the sporangia in smooth white folds; the sporangium-wall is generally single and membranous, with innate deposits of white lime granules, but in some parts of several gatherings it is double; the outer layer is white and densely calcareous, here and there separating from the membranous inner layer; the latter is usually colourless, but sometimes purplish and wrinkled; columella none; capillitium consisting of numerous white lime-knots, rounded or irregular in shape, connected by rather short, sparingly branched, hyaline threads; the spores measure 10 to 12 μ, and are very dark purple-brown, strongly but not very closely warted on two-thirds of the surface; over the remaining third the spore-wall is thinner and paler, and the warts more scattered (Pl. 386, fig. 4). Other gatherings with precisely the same characters were obtained at Chaul End (the source of the April discovery) in June, 1897; at Barton, some miles distant; and at Nether Crawley, in October, 1897; in this last the spores, though very dark, are a shade browner, paler and more uniform in colour. The dark spores and characteristic capillitium suggested that in these gatherings we had a form of *P. didermoides*, but the sessile sporangia agreed with Rostafinski's description of *P. lividum*. The typical form of *P. didermoides* Rost. has erect ellipsoid sporangia with white membranous stalks rising from a well-developed white hypothallus, a capillitium with numerous rounded lime-knots, and purple-brown, almost black, spores. Rostafinski's description of

P. lividum, in his *Monograph*, p. 95, is as follows:—"Sporangia irregularly shaped, hemispherical, depressed, sessile, greyish white or white; columella none, or a central mass formed from the capillitium; capillitium with numerous roundish snow-white lime-knots; spores violet-black, with a thick strongly spinulose membrane." He then gives var. *licheniformis* "with the sporangia seated on a strongly developed hypothallus," quoting a gathering from Bethlehem, S. Carolina, and var. *conglobatum* "without hypothallus." The essential points of difference between *P. didermoides* and *P. lividum* resolve themselves into the shape of the sporangia, and the presence or absence of a stalk. As indicating the difficulty Rostafinski felt in this distinction, he has marked a specimen from Ceylon (No. 135, Kew Coll.), which has sessile irregularly-shaped sporangia, as *P. didermoides*. In both English and American specimens of undoubted *P. didermoides* we meet with both ellipsoid and irregularly-shaped sporangia and stalked and sessile sporangia in the same development; the characters which distinguish *P. lividum* seem therefore to fall to the ground. At the same time the extreme forms represented by gatherings in which no sessile sporangia occur and those in which no stalked sporangia occur (as is the case with the Chaul End specimens) should be recorded as varieties, and I mark the latter as *P. didermoides* var. *lividum*. The type of *P. lividum* var. *licheniforme* Rost. referred to above, is in Nees's herbarium at Strassburg, and was collected by Schweinitz at Bethlehem, S. Carolina; the subglobose sporangia are seated on a white hypothallus. I have given it as a sessile form of *P. didermoides* in Brit. Mus. Cat. Myc. p. 55. There is a specimen from Mr. F. L. Harvey, Orono, Maine, in the Brit. Mus. Coll. (B. M. 1595) which I mark *P. didermoides* var. *lividum;* the sporangia are globose; it is the only example of the species we have met with in which the spores are identical with those of the gatherings from Chaul End. The unequal thickness of the spore-wall seems, however, to be too inconstant to be an important character.

PHYSARUM DIDERMOIDES Rost. On Oct. 19th, 1897, I received a good supply of this species from a large growth found on a heap of stable manure by Mr. C. Crouch at Mead Hook Farm, near Pulloxhill, Beds. The greater part is a fairly typical form with erect ellipsoid sporangia on white membranous stalks; a considerable portion, however, consists of irregularly globose sessile sporangia seated on a white hypothallus; the capillitium is of the normal form, with small rounded lime-knots connected by slender flexuose sparingly branched hyaline threads, and frequently with a large central mass of lime composed of confluent lime-knots; the spores are very dark purple-brown, closely and regularly spinulose all over, 14 μ diam. (Pl. 386, fig. 5). On Nov. 16th, 1897, I had another fine gathering from Miss Agnes Fry, from Failand, near Bristol; it was part of an abundant growth on an old heap of stable manure in an open field. This specimen differs from that sent by Mr. Crouch in the larger size of the sporangia, which are irregularly ellipsoid, and all sessile on a profuse white hypothallus. The capillitium and spores are similar to the last and quite typical. The inner sporangium-wall of the Mead Hook gathering is purplish and wrinkled into areolæ; that from Failand is more even, and paler in colour. Both of these developments differ from the Chaul End gatherings of the var. *lividum* in the more ellipsoid sporangia, the more abundant white hypothallus, and in the more rounded and smaller lime-knots; the spores are also somewhat different in having the spines equally distributed over the uniformly dark surface. It is likely that this species and its varieties might often be found if stackyards were searched; but the only British gatherings I had previously met with were one in Berkeley's herbarium from King's Cliff, and one from Hooker's herb. marked "Purton"; both these specimens are in the Kew Collection, and had been determined by Rostafinski as *P. didermoides*.

Physarum straminipes, n. sp. (Pl. 386, fig. 2). On May 3rd, 1897, Mr. Saunders sent me a specimen of an unfamiliar *Physarum* gathered the day before at Chaul End, near Dunstable; and on our visit to the spot on May 6th we found it in considerable abundance on the damp straw. It holds a position between *P. compressum* and *P. didermoides*, but differs from both in so many points that it appears necessary, in order to avoid confusion, to mark it as a distinct species. The habitat is on straw, stable manure, and dead leaves. Plasmodium white; sporangia greyish white, obovoid or wedge-shaped, averaging 0·7 mm. diam., single or clustered on longer or shorter stalks; or sessile, subglobose, ellipsoid, or bolster-shaped on a broad base, crowded or rather scattered; sporangium-wall membranous, with dense innate clusters of white lime-granules, colourless or purplish in the lower part; stalks yellowish white or straw-coloured, membranous, or somewhat cartilaginous, often 2 mm. long, filiform or flattened, smooth, often branched and anastomosing, merging into a hypothallus of the same parchment-like structure, semitransparent, and quite free from refuse-matter; columella none, or represented by a central mass of confluent lime-knots; capillitium rigid and persistent, of rather large ovoid or rhomboidal lime-knots, connected by straight hyaline glass-like rods, flat and broad at the junction with the knots, or terete and flexuose where they spring from the sporangium-wall; after the dispersion of the spores the capillitium retains the shape of the sporangia to a remarkable degree, giving the appearance, under a pocket-lens, of unbroken sporangia; the spores, as seen with moderate magnification, are dark purple-brown, with a mottled appearance; high magnification shows the spore-wall to be olive-brown, beset with crowded dark warts occupying broad irregular patches; these are separated from each other by nearly smooth intervening spaces, having the effect of pale bands. Besides the gathering near Dunstable the species has been obtained at several stations within a radius of a few miles; it was generally found on straw, but one gathering by Mr. Crouch at Pulloxhill was on dead leaves in a dry ditch. On March 11th, 1898, we found it in vast abundance on stable manure round sea-kale pots in my garden at Lyme Regis, Dorset. In all the gatherings the characters have been constant, both as regards the shape of the sporangia, the persistent capillitium, and the mottled spores. I give the specific name *straminipes* on account of the straw-coloured stalks; these and the peculiar structure of the spores constitute tha essential points of difference which distinguish this species from *P. compressum*, its nearest ally.

Didymium Trochus, n. sp. (Pl. 386, fig. 1). Among the interesting species which the search in straw-yards has yielded during the past year is a *Didymium* which appears to be undescribed, and has not been met with in any of the collections we have examined. It is allied to *D. difforme* Duby in possessing a convex egg-shell-like upper sporangium-wall rising from a broad base; it has also a somewhat rigid and sparse capillitium. It differs from *D. difforme* in the sporangia being provided with a stalk, in the presence of a prominent columella, and in the warted spores. The prevailing shape of the sporangia is that of a peg-top (hence the specific name), but much diversity of form occurs, as will appear in the account given later. We first discovered the species, with both stalked and sessile sporangia, on straw at Chaul End, May 6th, 1897. On July 8th we received a further supply from Mr. Saunders, gathered in a stackyard at Barton. The sporangia were mostly top-shaped, but in some the stalks were very short. On Oct. 28th Mr. C. Crouch sent us a large gathering which he had found on "a heap of turnips and haulm" at Kitchen End, near Ampthill. A part of the growth was in "buttercup yellow" plasmodium, some of which he sent with the ripe sporangia in a box packed with moss; during the transit by post the plasmodium crawled on to the moss, and there formed sporangia. In this gathering the stalks are almost all well developed. In the same month we received from Mr. E. S. Salmon a small gathering on dead leaves, which he had obtained in April, 1897, in the grounds at Clevelands, Reigate; the sporangia are sessile, and in this respect resemble many of those of our first gathering at Chaul End. The description of the species is as follows:—Plasmodium bright yellow, among dead leaves, straw, &c.; sporangia 0·7 to 1 mm. diam., pale ochre or white, hemispherical or top-shaped, stalked or sessile; sporangium-wall of two layers, the outer brittle and shell-like, composed of closely compacted angular or stellate crystals of lime, forming a hemispherical cap fitting on to the yellow-brown thickened margin of the broad columella; the inner layer membranous, entirely free from lime, usually adhering to the outer layer; columella ochraceous, smooth, convex, nearly as broad as the sporangium, filled with large and beautifully stellate snow-white crystalline masses of lime, which also extend downwards into the interior of the stalk; in many sporangia where the stalk is almost or entirely wanting the surface of the columella is beset with projecting lobes filled with stellate crystals, and often attenuated upwards into the threads of the capillitium; stalk yellowish brown, obconic or cylindrical, furrowed and wrinkled, often narrow at the point of attachment to the straw, and easily falling off; capillitium colourless or purple-brown, not profuse, persistent, the threads either almost simple from a broad base, or branched above, or anastomosing and forming a loose network; in the last case the threads are often interrupted by large vesicles containing crystals of lime; spores brownish purple, 9 to 10 μ diam., strongly warted, the warts unevenly distributed, often in close clusters of three or four with intervening smooth spaces, as seen with a $\frac{1}{15}$-inch objective.

Badhamia ovispora Racib. (Pl. 386, fig. 3). I give a figure of this species, which was described in the *Journal of Botany* for September, 1897, p. 354, to illustrate the plasmodiocarp form it sometimes assumes, and the ellipsoid shape of the spores. Although the only other recorded gathering appears to be that by Raciborski in Poland, which established the type, it is probably not uncommon, to judge from the fact that it has been found in stackyards in three localities in the summer of last year.

Physarum vernum Somm. Within the last three months we have received specimens representing several large growths of this species, on straw, from the neighbourhood of Luton and Ampthill. They are interesting as corresponding almost exactly with Sommerfelt's type from Christiania. The sporangia vary in shape and size; those from Mr. Crouch, from Kitchen End, are mostly plasmodiocarps, measuring 0·6 to 1 mm. broad, and sometimes 18 mm. long; the sporangium-wall is densely charged with lime, and in some parts consists of two layers, the outer separating from the inner. The capillitium resembles that in Sommerfelt's type in having a true *Badhamia* character in some parts, and abundant hyaline threads in others; the spores measure 9 to 10 μ, and are rather paler than the type, but are distinctly darker than in *P. cinereum*. Another specimen from Chigwell, Essex, has darker spores again; the sporangia are small, and closely resemble those of *P. cinereum*. I record these gatherings because of the indefinite boundaries of this newly-revived species (described Journ. Bot. June, 1897), and because we had not before obtained it with the characters of Sommerfelt's type so strongly marked, or in such abundance.

Diachœa bulbillosa (Berk.) Lister. Among the specimens of Mycetozoa collected in Java by Prof. Penzig in 1896-7, and kindly submitted to me for inspection, is a *Diachœa* which I have named as above. It was found in abundance, sometimes thousands of individuals together, on dead leaves and stems in the Botanical Gardens at Buitenzorg and Tjibodas. The sporangia are globose and iridescent, on conical white stalks; these are densely charged with lime, and extend into the sporangia to about half their height as columellæ; the capillitium is a network of purple-brown threads spreading from the columella to the membranous sporangium-wall; in part of the gatherings the stalks are brown and narrow above, and expand below into a broad white base; the lime they contain is in the shape of angular nodules. This latter form corresponds with the type of *Didymium bulbillosum* Berk. & Broome from Ceylon, published in *Journ. Linn. Soc.* vol. xiv. p. 84 (Brit. Mus. Coll. No. 592; Berkeley's herb., Kew, No. 1514). It is referred to Brit. Mus. Cat. Myc. p. 91, under *Diachœa elegans* Fr. as differing from the usual type of that species in the globose heads and rougher spores. The occurrence of the form in such abundance in Java, invariably with globose sporangia, and with violet-grey spores of the same colour as those of the Ceylon specimen and marked with similar scattered warts, confirms the integrity of the species; it must, however, be transferred from the genus *Didymium*, in which Berkeley placed it, to *Diachæa*.

The camera lucida drawings in the plate (Pl. 386, figs. 6, 7, 8, 9, 10), taken with a $\frac{1}{15}$-inch immersion lens, show the difference of spore-sculpture which distinguishes the five recorded species of *Diachæa*.

Description of Plate 386.—1. *Didymium Trochus*. 2. *Physarum straminipes*. 3. *Badhamia ovispora*. 4. Spore of *Physarum didermoides* var. *lividum*, collected at Chaul End, × 600. 5. Spore of *P. didermoides*, collected at Mead Hook Farm, × 600. 6. Spore of *Diachæa elegans* × 600. 7. Spore of *D. splendens* × 600. 8. Spore of *D. Thomasii* × 600. 9. Spore of *D. subsessilis* × 600, referred to Journ. Bot. June, 1897, p. 213. 10. Spore of *D. bulbillosa* × 600.

a, sporangia × 20; *b*, capillitium and spores × 280; *c*, spore × 600; *d*, crystals of outer sporangium-wall × 280; *e*, crystals in the columella × 280.

NOTES OF A TOUR IN N. SCOTLAND, 1897.

By Rev. E. S. Marshall, M.A., F.L.S., & W. A. Shoolbred, M.R.C.S.

The undermentioned plants were observed between July 14th and August 12th. A day was spent in working the coast of Thurso Bay, Caithness (109), *viâ* Scrabster to Holburn Head. We stayed a short time at Melvich, W. Sutherland (108), and passed five days at Betty Hill very pleasantly, Tongue and its neighbourhood afterwards occupying our attention for nearly a fortnight. The grand-looking corries on the east side of Ben Hope disappointed us; but Ben Laoghal (about as fine a hill as there is in Scotland, though not of any great height) produced several things of considerable interest. A brief sojourn at Altnaharra, where we were nearly devoured by midges, enabled us to add *Carex chordorrhiza* to the British Flora, and we believe that this place is well worth exploring systematically. Thence we journeyed southward to Golspie, E. Sutherland (107), and Tain, E. Ross (106); finally breaking our journey for a few hours at Dunphail, Inverness-shire, which is in Watson's v.-c. 95, Elgin. With the exception of the last two days, we had an almost unbroken spell of fine weather, and managed to collect a good many rare or critical species. Particular attention was paid to the forms of *Hieracium* and *Euphrasia*, in which this part of the country is decidedly rich.

The sign * denotes a new vice-comital record; † an apparently new British plant.

We are indebted for much kind help in determining doubtful specimens to Messrs. Arthur Bennett, Crépin, H. & J. Groves, Hanbury, Kükenthal, E. F. Linton, G. Nicholson, Rogers, and Prof. Wettstein.

Thalictrum collinum Wallroth. 108.* Melness Sands, Tongue Bay, associated with *T. dunense;* also on rocks at Ardsgionaich Point, at the N.W. end of the Bay.

Ranunculus Flammula L. var. *radicans* Nolte. 108. Sandy shore of Loch Naver, Altnaharra; many of the specimens very characteristic, but shading off into the ordinary form, and some quite erect, though in other respects just like the prostrate, rooting state. —*R. scoticus* E. S. Marshall (*R. petiolaris* ejusdem, non Bonpland, Humboldt, & Kunth). 108. Lochan Hacoin, near Tongue; Loch nan Uan, below Ben Klibreck, Altnaharra. Our recent observation of this plant in a wild state has confirmed us in the belief that it should be separated from *R. Flammula* as a good subspecies; as Mr. Symers Macvicar has noticed, it appears to occur only on stony lake-margins over a subsoil of peat.—*R. Steveni* Andrz. 108. Rocky bay about a mile W. of Melvich. 109. Sparingly in a damp hollow on Holburn Head, together with a curious dwarf state of *R. Flammula.* — *R. bulbosus* L. 107. Sandhills, Brora; Golspie Links. 108. Melness Sands. — *R. Ficaria* L. 108. Ascends to 1800 ft. on Ben Laoghal.

Caltha radicans Forster. 108.* By the Ribigill Burn, above the bridge which crosses it about a mile from Tongue; scarcely differing from *C. palustris* in leaf-characters—it may perhaps be the var. *zetlandica* Beeby, which we have not seen.

Papaver dubium L. 107. Golspie.

Neckeria claviculata N. E. Brown. 108. Tongue; only seen at one spot.

Cardamine flexuosa With. 107.* Dunrobin Glen, Golspie.

Draba incana L. 107. The small state mentioned by Syme as growing near Tain is abundant on Golspie Links.

Cochlearia officinalis L. 109. Very luxuriant in a gully on Holburn Head. A peculiar scurvy-grass grows on the coast of the Dornoch Firth, between Edderton and Tain, 106, with leaves much like *C. anglica*, but approaching *C. alpina* in the pods, which are strongly reticulate when ripe. Prof. Haussknecht suggests that this may be a hybrid; if so, it is pretty sure to be *C. groenlandica* × *officinalis;* but we did not notice the former thereabouts, and its seeds appear to be perfect; the shape of the fruit is also against this view. — *C. groenlandica* L. 107.* Shores of Loch Fleet, near Golspie; much eaten down by rabbits. 108. S.E. shore of the Kyle of Tongue, on decomposing mica-schist. 109. Abundant and very dwarf in short turf, Holburn Head.

Sisymbrium Thalianum J. Gay. 107.* Golspie; Brora (*Thlaspi arvense* is not uncommon at both these places). — [*S. Sophia* L. 107.* Shore at Golspie; only one plant, evidently a mere casual.]

Cakile maritima Scop. 107.* Coast between Brora and Golspie; also by Loch Fleet.

Helianthemum Chamæcistus Miller. 107. Scarce and very local on cliffs half-way between Brora and Golspie.

Viola ericetorum Schrader. 107.* Near Brora. — *V. Curtisii* Forster. 107.* Between Brora and Golspie; the same form which is abundant on Dunnet Links, Caithness.

Lychnis Githago Scop. 106. Cornfield near Edderton.

Cerastium tetrandrum Curtis. 107. Golspie Links. A not uncommon species on the sandy coasts of N. Scotland. — *C. triviale* Link, var. *alpinum* Mertens & Koch. 108. In rills on Ben Hope, at 2500 ft.

Stellaria media Cyr. var. *Boræana* (Jordan). 106. Coast near Edderton. 107. Stony shore of Loch Fleet, near Golspie, in great plenty.

Sagina maritima Don and *S. nodosa* Fenzl. 107.* Golspie Links. —*S. procumbens* L. var. *spinosa* S. Gibson. 107. Shore of Loch Fleet.

Buda rubra Dumortier. 107.* Plentiful on the railway near the head of Loch Fleet for about half a mile.—*B. marina* Dumortier. 107.* Shores of Loch Fleet; both type and var. *neglecta*.—*B. media* Dumortier. 107.* With the last. A strong, somewhat glandular form occurs near Edderton, 106.

Hypericum pulchrum L. var. *procumbens* Rostrup. 109.* Among grass and stunted heather near Holburn Head, the smaller specimens just matching Mr. Beeby's Shetland plant, but more luxuriant as a rule; uniformly procumbent.

[*Malva moschata* L. 108. The white-flowered form occurs sparingly by the Ribigill Burn, just below Tongue village, having probably been "seeded down" from gardens. *M. sylvestris* was seen at Golspie near houses, and looking like an outcast or escape.]

Erodium cicutarium L'Héritier, var. *glandulosum* Bosch. 107. Sandy ground near the N.W. end of Loch Fleet.

Astragalus danicus Retz. 107. Sandy coast midway between Golspie and Brora.

Lathyrus pratensis L. A hairy form occurs at Kirtomy Bay, near Farr, 108, and is abundant on cliffs near Scrabster, 109. "Scarcely *lanuginosa-villosa* of Fries: rather between that and type." Ar. Bennett *in litt.*

Prunus Avium L. 95. Rocks and cliffs above the Divie, near Dunphail—a plant with peculiar leaf-serration, for which Mr. Nicholson could give no special name; we judged it to be indigenous. 107.* Dunrobin Glen, Golspie; *P. Padus* also grows there.

Rubus villicaulis Koehler. 107.* About Golspie, not unfrequent. —*R. Selmeri* Lindeberg. 106. Between Meikle Ferry and Tain.— *R. hirtifolius* Mueller & Wirtgen, var. *danicus* (Focke). 108. The most plentiful species around Tongue, where Mr. Hanbury collected it several years since. — *R. mucronatus* Bloxam. Plants from 106 (Edderton) and 107 (near Loch Fleet) with glandular-aciculate stems are named "forma *aspera*" by Mr. Rogers. The small and neat-leaved northern bramble so characteristic of N.E. Scotland occurs about Golspie, differing from the others only by its weaker armature. — *R. radula* Weihe. 107.* Typical and frequent at Golspie. — *R. Balfourianus* Bloxam. 108.* A large patch of this was met with on the coast at Auchninver (below Coalbackie), near Tongue. It is not quite typical, having stamens about as long as the styles, not falling short of them; but the very large petals, the leaves, and the barren stems are quite characteristic.

Rosa mollis × *pimpinellifolia*. 108. The beautiful rose from near Betty Hill, for which M. Crépin had already suggested such an origin, he now decidedly confirms as this hybrid. There are three distinct colonies within a few hundred yards, all exactly resembling one another. *R. mollis* grows at no great distance, but is much scarcer than *R. tomentosa*.—*R. pimpinellifolia* × *tomentosa*. 107. In the valley of the Brora river, about a mile above the village.—*R. glauca* × *pimpinellifolia*. 107.* By the river-side at Brora—a single bush. M. Crépin assents to our identification of it with *R. hibernica* var. *glabra* Baker. — *R. coriifolia* Fries, var. *Bakeri* (Déséglise). 107. Near the shore of Loch Fleet; also frequent about Brora. "C'est une var. du *R. coriifolia* Fries faisant partie du *R. Bakeri* Déségl. Ce *R. Bakeri* peut avoir les pédicelles lisses ou un peu glanduleuses" (Crépin *in litt.*). The strongly-hooked prickles are very characteristic of this fine rose, which is by no means uncommon on the coasts of E. Ross and E. Inverness, varying somewhat in armature, but well marked upon the whole.

Cratægus monogyna Jacq. 108. A form with curious deeply-incised broad leaf-segments was found in a precipitous birch-wood on the E. side of the Kyle of Tongue; certainly native.

Sedum anglicum Hudson. 107.* Coast near Golspie.

Epilobium alsinefolium × *palustre*. 106. Rocky streamlet on the W. side of Ben Laoghal at 1700 ft., together with the parents.

Circæa alpina L. 107.* Dunrobin Glen, Golspie. The *C. intermedia* Ehrhart, of Scotland, which grows near Dunphail, can hardly be a hybrid, as it is found abundantly in localities from which *C. lutetiana* appears to be altogether absent.

Conium maculatum L. 107.* Brora; Golspie—in the former station, at least, it appears to be truly wild.

Carum Carvi L. The caraway now grows plentifully over quite half a mile of ground near Melvich, and *looks* quite indigenous; but it occurs as an evident escape on other parts of the north coast, so that it may be merely naturalized here.

Ægopodium Podagraria L. 107. Golspie; not native, we believe.

Pimpinella Saxifraga L. 107.* Coast between Brora and Golspie. 108. Var. *dissecta* With. was met with in limited quantity on Melness Sands, near Tongue, among a large quantity of another variety (also abundant on sandy ground at Farr Bay), which seems to approach *P. nigra* Willd., as defined by Koch, Syn. ed. 2, p. 446 (*not* the var. *nigra* of p. 316), though the pubescence is less marked than in that description; it can certainly not be referred to the type, and tends towards *P. major* in habit.

Ligusticum scoticum L. 108. Rocky coast, Betty Hill.

Caucalis Anthriscus Hudson. 107. Golspie.

Linnæa borealis L. 107. In the middle of a pine-wood near Golspie. We had previously been informed of its occurrence there, and though it appears to be well known locally, it is not recorded from E. Sutherland in Top. Bot. Extremely scarce; only three or four plants were seen.

Galium palustre L. We believe that all the plants seen by us in 106–8 were var. *Witheringii* (Smith). — *G. Aparine* L. 108. Mr.

Bennett writes as follows about a plant which we found growing sparingly in shade on the coast below Coalbackie, near Tongue:—"This seems to be var. *angustifolium* Meyer = *G. infestum* Waldst. & Kit. Norman records it from Arctic Norway." *G. infestum* is identified by Nyman with *G. Vaillantii* DC., which our specimens closely resemble in their narrow leaves and patent inflorescence; but the flowers are white and the fruits few—perhaps not a fatal objection, as the plants are by no means luxuriant. A strong, prostrate, large-fruited form of *G. Aparine* abounds on the shingly beach at Thurso.

Scabiosa arvensis L. 108. A beautiful form with white blossoms occurs in small quantity at Melness; the type is abundant there, as well as about Farr Bay, near Betty Hill.

Filago minima L. 107. Golspie Links; plentiful near the head of Loch Fleet, on sandy ground and railway ballast.

Achillea Millefolium L. var. *lanata* Koch (1837). 109. Scrabster; just Mr. Beeby's Shetland plant. Mr. Bennett suggests that this may be the same as var. *villosum* Hartman, Hand. Sk. Fl. ed. 1, p. 419 (1820).

Artemisia vulgaris L. var. *coarctata* (Forselles). 108. Melness Sands. The clothing is much more woolly than in the common plant of S.E. England, but its habit does not differ appreciably. Probably this Sutherlandshire plant may be typical *coarctata*, which Nyman localizes as "Balt. litor."

Arctium nemorosum Bab. 107.* Coast between Brora and Golspie, scarce. "Query, whether of Lejeune? But I believe it is, and that Lange, Konicke &c. are wrong in referring our plant to *intermedium*" (Ar. Bennett, *in litt.*). *A. minus* Bernh. was seen in two or three stations near Tongue.

Centaurea —— ? 108.† A handsome knapweed was found in considerable quantity among the sandhills below Coalbackie, on the E. side of Tongue Bay, and quite sparingly near Melness, on the W. side, associated with *C. nigra* and great abundance of *C. Scabiosa*, which is also very plentiful on slopes S.E. of Farr. Bay. In its usual form this is a yard or more in height, few- (1–4, usually 2-) flowered, with long peduncles; leaves of a light clear green, entire or somewhat obscurely crenate-dentate, the lowest with a blade about 4 in. long and 1½ in. or more in its greatest breadth, gradually narrowed into a petiole of almost its own length, which (as well as the midrib and principal nerves beneath) is more or less hispid with crisped white hairs. The uppermost leaves are subsessile. The heads differ but little from *C. Scabiosa*, of which it has the radiant florets, and which is certainly its nearest ally. At Melness it is accompanied by a smaller form, little more than a foot high, the leaves being lanceolate, darker green, and quite entire; we do not think that these can be kept apart. The only example in the large general collection at Cromwell Road which at all closely approaches this Sutherlandshire plant is one from dry wood-borders, Leopoldsruhe, near Lienz (S.E. Tirol), on schistose soil at 2300–2400 ft., *legit* Gander, 1871; it was sent out with a typical specimen, and is labelled merely "*C. Scabiosa*, L." Koch remarks (Syn.

ed. 2, p. 473): "Variat . . . rarius foliis integris lanceolatis et superioribus tantum basi pinnatifidis." We believe that our Tongue Bay plants, if their characters are fairly well retained under cultivation, will deserve to be at least varietally separated from *C. Scabiosa;* they flower a little later, and we had some difficulty in obtaining sufficiently advanced material. *C. Cyanus* grows in fields at Golspie.

Hieracium holosericeum Backhouse. 108. Rocky ground below Ben Hope, on the E. side, in no great quantity.—*H. globosum* Backhouse. 108.* Rocks at the summit of the Lion Peak, Ben Laoghal; W. side of Ben Klibreck, at 2000 ft. The leaves are longer than usual, probably owing to its being in shade; Mr. Linton has observed the same peculiarity in plants growing above Loch Etachan, in the Cairngorms. Another alpine hawkweed, found sparingly at 1800 ft. on Ben Hope, is placed as an undescribed dark-styled variety of this by Messrs. Hanbury and Linton, who gathered it on the same mountain ten or twelve years since.—*H. curvatum* Elfstrand. 108. Ben Laoghal; locally abundant.—*H. lingulatum* Backhouse. 108. Rather plentiful on the N. side of Ben Laoghal, descending to 1000 ft.; a few of the plants had yellow styles.—*H. anglicum* Fries, var. *acutifolium* Backhouse. 108. Coast near Coalbackie—a few specimens, the type being common. Var. *longibracteatum* F. J. Hanbury is frequent in this district.—*H. iricum* Fries. The most abundant species on the N. coast of Scotland, according to our experience. It is often stylose in the Tongue neighbourhood. — *H. Carenorum* F. J. Hanbury. 108. We were fortunate in discovering two new stations for this fine plant, which had previously been gathered only in very small quantity to the W. of Ben Hope; *viz.* at Betty Hill and by streams near Coalbackie and Rhi-tongue. It is liable to be confounded with *H. argenteum* Fries, var. *septentrionale*, but presents good marks of divergence, especially in the clothing of the heads. The latter plant was gathered on the coast near Betty Hill, and on rocks by Talmin Bay, N.W. of Tongue. —*H. proximum* F. J. Hanbury. 109. Abundant on low cliffs between Thurso and Scrabster.—*H. caledonicum* F. J. Hanbury. 107. Cliffs midway between Brora and Golspie; too far advanced to be worth gathering, still we feel no doubt about its being this species. 108. Plentiful along the coast of Tongue Bay; Kirtomy, near Farr. 109. Cliffs between Thurso and Scrabster. — *H. rubicundum* F. J. Hanbury. 108. N. side of Ben Laoghal, at about 1200 ft.—Var. *Boswelli* (Linton). 108. By streams near Melness and Tongue; locally abundant. — *H. nitidum* Backhouse. 108. We saw this in several places near Tongue, but in no great quantity. — *H. Sommerfeltii* Lindeberg. 108.* Rocks by the path from Kinloch Lodge to Ben Hope, at 1500 ft.; heads more floccose than usual. — *H. scoticum* F. J. Hanbury. 108. Very plentiful on the steep grassy banks of the Kirtomy Burn, near Farr, and frequent in that neighbourhood; the specimens collected inland were often decidedly glaucous. By a streamlet to the W. of Talmin Bay, near Tongue. — *H. onosmoides* Fries, var. *buglossoides* (Arvet-Touvet). 107.* Cliffs midway between Brora and Golspie; just the plant of E. Ross.—*H. stenolepis* Lindeberg, var. *anguinum* W. R. Linton. 108.* Sandhills at Auchninver, Tongue Bay; extremely scarce, having probably sprung from the seed of a larger colony on the inaccessible cliffs above. So far as we know, it had only been obtained before in Dumfriesshire. A single specimen of the type was found on rocks by the road, near Armadale.—*H. rivale* F. J. Hanbury. 108. Mr. Hanbury so names three gatherings from the N. side of Ben Laoghal, at 1200–1500 ft., and one from the coast of Tongue Bay, near Melness.—*H. murorum* L. var. *crassiusculum* Almquist. 108. Rocks near the coast between Talmin Bay and Loch Fhasgaidh.—*H. cæsium* Fries. 108. N. side of Ben Laoghal, at 1200–1500 ft. Named by Mr. Hanbury; the specimens agree very well indeed with No. 125 of Prof. Lindeberg's Hier. Exsicc. Scand., from Stockholm, which he (C.J.L.) considers to be the true plant; the only difference consists in our plants having rather more clothing on the heads and phyllaries and more ciliate leaves, which is evidently due to their being in a less advanced stage.—*H. cæsio-murorum* Lindeberg. 108.* Coast and stream-sides about Coalbackie, near Tongue; ascending to fully 1500 ft. on Ben Laoghal. In this district the leaves are often spotted.—*H. orarium* Lindeberg, var. *fulvum* F. J. Hanbury. 108. Melness Sands, Tongue Bay, in profusion over a small area; this is a beautiful plant with deep orange-yellow blossoms and very yellow foliage. 109. Cliffs between Thurso and Scrabster—only a few specimens were found. —*H. duriceps* F. J. Hanbury. 108. Rocky streamlet on the W. side of Ben Klibreck, at 1800 ft.—*H. dissimile* Lindeberg. 108.* Coast of Tongue Bay, near Melness. Mr. Linton considers this to be the typical plant, or at least very near it. — *H. angustatum* Lindeberg. 108.* Ben Klibreck, at 2000 ft. As Mr. Linton has pointed out to us, this plant agrees admirably with No. 128 of Hier. Scand. Exs. (var. *elatum* Lindeberg). Mr. Hanbury's opinion was: "near *H. cæsium*," which is quite true. — *H. zetlandicum* Beeby. 108.* Sandy, grassy slopes about half a mile S.E. of Farr Bay, plentiful; a single plant was also collected at Kirtomy. While gathering this, which is a most interesting novelty for the British mainland, we were strongly reminded of the Shetland species; and careful comparison with an excellent series received from Mr. Beeby himself has convinced Mr. Hanbury that they cannot be kept apart. The Sutherlandshire form is superficially very unlike leafy-stemmed specimens from rocks by Roeness Voe (No. 1092), but closely approaches those from short turf above Sand Voe (Nos. 1044, 1084) and North Ross (No. 1083), Northmaven; its leaves, however, being larger and less hairy (which the difference of situation fully accounts for). The styles are livid, instead of nearly pure yellow; but there is very little difference in the heads, which are somewhat more hairy, glandular, and floccose, as might be expected. — *H. dovrense* Fries. 108.* Rocks on the N. side of Ben Laoghal, at 1000 ft.; most rare. "Good type—the best yet seen in Britain." Hanbury, *in litt.* Our specimens indeed match well with Hier. Scand. Exs. No. 39, from the Dovre-fjeld. — *H. strictum* Fries. 95. Ravine of the Divie, Dunphail; frequent. 107.* Bank above the Brora river, half a mile above the village. 108. Stream-sides about Tongue and

Coalbackie, in plenty; W. coast of Tongue Bay. — *H. reticulatum* Lindeberg. 108. By the Ribigill Burn, near Tongue.—*H. angustum* Lindeberg. 95.* Rocky banks of the Divie, above Relugas House, Dunphail. — *H. corymbosum* Fries. 108. Stream-side near Kinloch Lodge, Tongue.—*H. auratum* Fries. 107.* Brora, on banks above the river. 108. Plentiful on the E. side of Tongue Bay.—*H. boreale* Fries. 95.* Roadside near Relugas, Dunphail.

Tragopogon pratense L. 108. Sands at Farr Bay, Melness, and Coalbackie; the type.

Pyrola minor L. 108. Fir-wood near the School, Rhi-tongue—kindly pointed out to us by a gentleman of the neighbourhood.

Moneses grandiflora Gray. 107. Balblair Wood, near Golspie.

Primula scotica Hooker. 108. Coast near Talmin Bay. We have been informed that it extends as far west as Durness.

Anagallis tenella L. 108.* By Loch Mer, Betty Hill; also near Kinloch Lodge, Tongue.

Erythræa littoralis Fries. 107.* Plentiful in damp grassy ground by Loch Fleet.

Gentiana Amarella L. 106, 107. The peculiar plant which was first noticed by Mr. Beeby in Shetland and by Hanbury & Marshall on Keiss Links and Reay Links, in 1886, also grows in profusion over Golspie Links, as well as sparingly on blown sand near Tain, to the exclusion of the type. The flowers are uniformly of a greenish white. The name "forma *multicaulis*" given to it by Prof. Lange is not very descriptive, as (although frequently branched) it is often simple-stemmed; we believe it to be a permanent variety, and hope to test this by raising it from seed. — *G. baltica* Murbeck, 108.* Stony, hilly ground to the W. of Melvich; scarce and stunted.

Pneumaria maritima Hill. 106. Shingly bank between Edderton and Meikle Ferry. 108. Kirtomy Bay, near Farr.

Myosotis collina Hoffmann. 107.* Sandy coast between Brora and Golspie.

Solanum Dulcamara L. 108.* Among bushes near Betty Hill; only one plant seen.

[*Hyoscyamus niger* L. 107. Golspie; a casual here, as is *Verbascum Thapsus* L.]

Scrophularia nodosa L. 107. Golspie. 108. Tongue. We mention this, as it appears to be uncommon in the extreme north of Scotland.

Euphrasia. With one exception, the determinations were made by Prof. Wettstein. All our gatherings were also sent to Mr. Townsend; but he was unable to examine them in detail before leaving England, and we are thus deprived of the advantage of his comments. Over thirty collections were made, none of which have been determined as *E. Rostkoviana* or *E. gracilis;* these appear to be mainly replaced on the north coast by *E. brevipila* and *E. scottica*. —*E. brevipila* Burnat & Gremli. An extremely common plant in N. Scotland; it varies greatly. 95. Dunphail. 108. Very plentiful about Tongue, ascending to fully 2000 ft. on Ben Hope and Ben Laoghal, where it is small and usually unbranched. On grassy slopes at Talmin Bay occurs a dwarf, compact, branching form, 1–2 in. high; near Coalbackie, on wet pastures sloping down to a burn near the sea, a beautiful variation with very large and highly-coloured flowers abounds; and in meadows, &c., near Melness a luxuriant form (often over a foot high) is plentiful—we believe this to be identical with the eyebright so conspicuous on Reay Links, 109, which was formerly referred to *E. pratensis* Fries. — *E. borealis* Townsend. 106. Sedgy swamp on the coast a little N. of Tain; a tall state. 107. Grassy banks of the burn in the upper part of Dunrobin Glen, near Golspie. Hollows among the sandhills, Brora. 108. Altnaharra. — *E. scottica* Wettstein. 108. Altnaharra, abundant; by Loch Mer, near Betty Hill; plentiful near Tongue, especially along the coast about Melness and Talmin. On barren heathy ground near Talmin we found it very small and slender, with bright violet-purple flowers; usually they are whitish. — *E. curta* Fries, var. *glabrescens* Wettst. 106. Blown sand, E. of Tain, in great quantity; this peculiar plant is not unlike the figure of *E. curta* in Fl. Danica, t. 1037, which Wettstein (Mon. Euphr.) says is a bad one. 107. Sandy ground between Brora and Golspie —small and compact, much resembling the Herb. Normale specimens at Kew, except that these are very hairy, and so exhibit a superficial likeness to dwarf plants of the following.— *E. latifolia* Pursh. 108. Extremely abundant on exposed grassy cliffs near Melvich, eglandular (also seen on cliffs near Betty Hill); on the E. side of Tongue Bay, glandular. — Forma *grandiflora* Wettst. Bank above the Naver, Betty Hill, in two conditions; one of these scarcely differs from type, the other being taller and densely glandular. This well-marked subspecies appears to have been first noticed in 1886 (Hanbury & Marshall); it agrees very well with Fl. Danica, t. 2910. —*E. foulaensis* Townsend. Clearly this is quite common in the extreme north; it differs much in appearance, even in the same neighbourhood, being often only a bare inch in height and very fleshy, on grassy cliffs facing the north. All the gatherings placed here by Prof. Wettstein are distinguishable by the glabrescent bluntly-toothed leaves, small flowers with included tube, and especially by the full-grown capsules decidedly exceeding the sepals. 107. Damp grassy ground by Loch Fleet. 108. Melvich, in great quantity and very variable; marsh by the Naver near Betty Hill, above the bridge; E. side of Tongue Bay; Ben Laoghal, from 1000 to 1500 ft., and Ben Hope, at 2000 ft.—these alpine plants closely resemble Mr. Townsend's figure in Journ. Bot. for 1887. On Ben Hope and Ben Laoghal, where it grows mixed with *E. brevipila*, we gathered a few specimens intermediate in character, having the long capsules and glabrescence so noticeable in *foulaensis*, together with the larger flowers and stiff hairs of *brevipila*, and an occasional gland; these are almost certainly hybrids. 109. Cliffs between Thurso and Scrabster; Holburn Head.

Bartsia Odontites Hudson, var. *litoralis* Reichenbach (*Odontites litoralis* Fries). 107.* Damp submaritime pastures near Loch Fleet. 108.* Coast of Tongue Bay, near Melness. These agree well with continental specimens so named.

Rhinanthus Crista-galli L. var. *Drummond-Hayi* B. White. 108. Ben Hope.

Melampyrum pratense L. var. *hians* Druce. 95. Woods above the river, Dunphail. 108. Marshy ground by Loch Mer, near Betty Hill. A lovely plant when growing, but we can never manage to dry it satisfactorily.

Thymus Serpyllum Fries, var. *prostrata* Hornemann. Apparently common on the N. coast, *e.g.* at Betty Hill and on both shores of Tongue Bay.

Stachys palustris × *sylvatica* (*S. ambigua* Smith). 108. A garden weed at the Inn, Altnaharra.

Plantago maritima L. var. *minor* Hooker & Arnott. 108. Cliffs near Betty Hill and Melvich. 109. Holburn Head.—*P. Coronopus* L. var. *pygmæa* Lange. 108. Cliffs near Farr Bay. 109. Holburn Head.—Var. *ceratophyllon* Rapin. 108. Rocky cliffs above the Kyle of Tongue; just like the Dorset plant in leaf-cutting, though (being within reach of the salt spray) decidedly less hairy.

Atriplex Babingtonii Woods. 107.* On shingle, Golspie and by Loch Fleet. 108. Tongue Ferry. — *A. laciniata* L. 107.* Shore between Brora and Golspie—one fine plant.

Salicornia herbacea L. 107.* Muddy shores of Loch Fleet. 108.* S. end of the Kyle of Tongue.

Suæda maritima Dumortier. 106. Mud-flats of the Dornoch Firth, near Meikle Ferry. 107.* Loch Fleet. In both cases only the var. *procumbens* Syme was observed.

Salsola Kali L. 107. Sandy ground on the N. side of Loch Fleet; very scarce.

Betula pubescens Ehrhart, var. *parvifolia* (Wimmer). 108. Common about Tongue; particularly characteristic near Kinloch Lodge.

Salix pentandra L. 108. Near Tongue; rare. — *S. aurita* × *cinerea*. 108. Tongue, with *S. purpurea*. — *S. repens* × *viminalis*. 107.† Gravelly bush-grown ground by the river about a mile above Brora; a female plant, quite intermediate in character, the branches spreading and rooting at the base, then suberect, only about 1½ ft. in height. Neither of the parents was seen, the seed having probably been water-borne from higher up the valley. One of the handsomest willows that we have met with.—*S. purpurea* L. 108. By the stream descending from Loch Craisg to the Kyle of Tongue, just above the road to Betty Hill; only a few bushes, but apparently spontaneous.

Juniperus communis L. 106. A curious low-growing form, fruiting very freely, was gathered half a mile S. of Edderton Station. 107.* Seen from the railway in two or three places between Lairg and Golspie; we believe that we also found it on the outskirts of Balblair Wood, near Golspie. *J. nana* Willd. is common on the stony table-land at the E. base of Ben Hope, associated with *Loiseleuria procumbens* and *Arctostaphylos alpina*.

Listera cordata R. Brown. 107. Balblair Wood, near Golspie; locally plentiful. 108. N. side of Ben Laoghal, at 800–1000 ft.

Goodyera repens R. Brown. 106. Near Edderton. 107. Most abundant in pine-woods about Golspie. 108.* Wood close to Rhitongue School.

Epipactis latifolia Allioni. 108.* Ardsgionaich Point and Melness Sands; also at Auchninver, below Coalbackie, Tongue Bay—quite rare. Three or four specimens of *E. atrorubens* Schultz were found growing on a cliff above the Naver, opposite Betty Hill.

Allium ursinum L. 107. Dunrobin Glen. 108. Birch-woods, S.E. side of the Kyle of Tongue.

Juncus balticus Willd. 108. Melness Sands; very local, though it occurs in profusion over two or three acres.

Sparganium affine Schnizlein. 108. Loch Fhasgaidh, N.W. of Tongue, &c.—*S. minimum* Fries. In a swamp near Loch Naver, Altnaharra.

Potamogeton heterophyllus Schreber. 108. In the Mudal Water, Altnaharra, near its junction with Loch Naver.

Ruppia rostellata Koch, var. *nana* Boswell. 106. Most abundant on the mud-flats between Edderton and Meikle Ferry.

Zostera nana Roth. 106. With the last. 107.* Plentiful and very fine, Loch Fleet.

Scirpus rufus Schrader. 108. Coast of Tongue Bay, near Melness; scarce.

Carex paniculata L. 106. Plentiful in a swamp on the coast a little N. of Tain; the forma *simplicior* Andersson. — *C. Goodenowii* J. Gay, var. *juncella* Fries. 108. Marshy meadows near Loch Naver, Altnaharra; an unusually tall slender strict form.—*C.* ——? 108. In a nearly dry ditch close to the last-named, growing abundantly in rich peat-mud for about twenty-five yards, we came upon a handsome sedge which differed considerably in appearance from all that we had previously met with. Plant robust, 2–2½ ft. high. Root stoloniferous, creeping, with many decayed leaves of former years at the base of the stem. Leaves rather glaucous, keeled, channelled (semicylindric). Perigynium pale green (yellowish when dry), faintly veined. Nut dull brown, sessile, round, lenticular-compressed, dotted, with a rather short but distinct beak. Female spikelets 2–3, sessile, ¾–1½ in. long, quite erect in ripe fruit; male 1–2, about as long, with pale linear-oblong glumes. We have not yet received any opinion on this from Mr. Bennett; Herr Kükenthal wrote:—"Is very interesting. I recognize in it the hybrid *gracilis* × *vulgaris* [as we should say, *acuta* × *Goodenowii*], in a form approaching *C. gracilis*. The flatter fruits, the blunter glumes, and above all the channelled stem-leaves remind me of *C. vulgaris*, while the habit is quite like *gracilis*. Some fruits are abnormal, owing to puncture by insects." On our objecting that we had failed to find *C. acuta* near, and that it was unknown in N. Scotland, he still maintained this opinion. We have dissected out several perigynia, and find the nuts well developed; they scarcely differ from those of *Goodenowii*, though the beak is rather longer. The *facies* certainly reminded us much of *acuta* on the spot; but we are disposed to think that this is a well-marked variety of the former species. Rev. E. F. Linton thought it very near a sedge which he has gathered both in England and Ireland, but has not yet described. — *C. panicea* L. var. *tumidula* Laestadius. 108. Damp ground near Ardsgionaich Point, Melness; by Loch Mer, Betty

Hill (some of these specimens are not quite characteristic); identical with the plants of Fries, Herb. Normale, at Kew and British Museum, except in being smaller; it does not seem to us to be a very good variety. *C. capillaris* is luxuriant on wet slopes at Ardsgionaich Point; even last summer, which was exceptionally dry, it often reached a height of 12–14 in. We cannot think such *states* worthy of varietal distinction; no doubt the same objection may apply to several recognized dwarf "varieties," such as the following.— *C. extensa* Good. var. *pumila* Andersson. 107.* Damp pastures by Loch Fleet. — *C. Oederi* Retz. 107. Near Loch Fleet. 108. S. side of the Kyle of Tongue. 109. Holburn Head, in moist hollows; a very reduced state.

Milium effusum L. 107. Dunrobin Glen.

Agrostis palustris Hudson. Both var. *maritima* Meyer and var. *coarctata* (Hoffmann) were noticed between Edderton and Tain.

Deschampsia discolor Roemer & Schultes. 108. Marshy ground bordering on Loch Naver, Altnaharra.

Holcus mollis L. 107.* Near Golspie. *Avena pratensis* L.* was also seen here.

Poa nemoralis L. var. *Parnellii* Hooker & Arnott. 95. Shaded rocks above the Divie, nearly opposite Relugas House, Dunphail. *Festuca sylvatica* Vill. grows hard by.

Glyceria maritima Mert. & Koch. 107.* Muddy shores, Loch Fleet.

Bromus ramosus Hudson. 107. Dunrobin Glen.

Elymus arenarius L. 108. Melness Sands; locally abundant.

Asplenium marinum L. 107. Cliffs between Brora and Golspie; scarce. 108. Coast of Tongue Bay, both on the E. and W. sides, but rarely.

Equisetum arvense L. var. *nemorosum* Braun. 107. Fir-woods above Golspie.

Isoetes echinospora Durieu. 108.* Loch Mer, Betty Hill; Loch Fhasgaidh, W. of Talmin, near Tongue.

Chara fragilis Desvaux, var. *delicatula* Braun. 108. Loch Craisg and Loch Hacoin, near Tongue.

SUPPLEMENT TO WELWITSCH'S AFRICAN FUNGI.

By Annie Lorrain Smith.

In preparing the enumeration of Welwitsch's African Fungi for the *Catalogue* of his plants now in course of publication, I have found a few new species not included in the paper, "Fungi Angolenses" by Welwitsch and Currey, published in *Trans. Linn. Soc.* xxvi. pp. 270–294 (1868). These I now propose to describe. I have added notes on three species described in the paper.

Hexagonia Welwitschii, n. sp. Pileus dimidiate or adnate at the back and circular or oval in form, about 6 × 9 cm., edge rather acute. Tissue bright brown, floccose, firm, 1 to 2 mm. thick, the surface of the pileus golden brown, velvety, zoned with darker shades of brown, the zones more marked towards the base. Pores darker than the pileus, up to 8 mm. in depth, shallow towards the margin; in the dimidiate form about 3 mm. in depth, irregularly hexagonal, 2 × 3–4 mm. in diameter, edges acute; spores unknown.

On rotten trunks on the sepulchres of negro chiefs, in woods between Condo and Quisondo and near Quibinda, Pungo Andongo; March, 1857. No. 370.

Æcidium Diospyri, n. sp. Æcidia in small sparse groups on slightly discoloured spots, the cells of the leaf blackened and forming a hard ring round the cup, peridium about 160 μ in diameter, with a very delicate whitish wall; spores irregularly globose, 15–18 μ in diameter, very light yellow, epispore smooth, contents roughly granular.

On the leaves of *Diospyros mespiliformis* Hochst., near Trombeta, Golungo Alto; March, 1855. No. 208.

Phyllosticta Tricalysiæ, n. sp. Forming rather large grey spots with a reddish-brown margin; perithecia scattered, punctiform, small, 150 to 200 × 120 μ; spores oblong-elliptical, colourless, one-celled, 6 × 2 μ.

On the upper side of the evergreen leaves of *Tricalysia griseiflora* at the back of the Præsidium. Mata de Pungo, Pungo Andongo; Nov., 1856. No. 6.

Ascochyta Tiliacoræ, n. sp. Forming small, black, subspherical stromatoid spots on the upper surface of the leaves; perithecia closely grouped, lentiform; spores elongate, 2-celled, colourless, 12 to 15 × 3 μ.

On leaves of *Tiliacora chrysobotrys* Welw. in the woods of Alta Queta, Golungo Alto; Dec., 1855. No. 4.

A. Spondiacearum, n. sp. Forming white spots with a dark-brown margin; perithecia scattered, small, lentiform; spores elongate, 17 × 3 μ, colourless, 2-celled, one cell sometimes longer than the other.

On leaves of *Spondias Mombin* L. at Mata de Quisuculo, Golungo Alto; Feb., 1856. No. 173.

PHYLLACHORA REPENS Sacc. Syll. Fung. vol. ii. p. 597. *Sphæria lunaris* Welw. Curr. Trans. Linn. Soc. xxvi. p. 283.

On leaves of various species of *Ficus*, Golungo Alto. Nos. 74, 75, 76.

On examining these specimens I find that the stroma is superficial, and often on both sides of the leaf; it is formed of brown hyphæ and not, as described by Currey, from the tissue of the leaf. The spores are continuous, broadly oblong-obtuse, and measure 10–12 × 5–7 μ. Corda's original measurements for the spores of *Sphæria repens*, Ic. iv. p. 42, are 15 μ in length. I have, unfortunately, no opportunity of seeing his type specimen, but the drawing, *l. c.* fig. 123, leaves little doubt as to the identity of the two species. *Isothea rhytismoides* Welw. & Curr., *l. c.* p. 285 (on leaves of *Ficus trachyphylla;* Huilla: No. 141) is also synonymous with *P. repens*. These different specimens form a graduated series, which, as far as one may judge in the absence of type specimens, includes *P. Ficuum* Niessl. The specimens of this in Herb. Brit. Mus. are undoubtedly identical with *P. repens;* the spore-measurements given by Niessl are somewhat smaller, but the habit and appearance of the plants are the same, and the tendency of the stroma to follow the veins of the leaf is characteristic throughout.

P. IRREGULARIS. *Isothea irregularis* Welw. & Curr. *l. c.* p. 285. The stromata of this species are thickly scattered over large portions of the leaf; they are minute, black, shining, and seldom confluent; as a rule, there is but one perithecium in each stroma. The spores are continuous, oblong-obtuse, 12–7 μ, and are irregularly grouped in two rows in the ascus.

On the leaves of a species of *Ficus* (*cf.* Herb. Welw. No. 6335), Golungo Alto; March, 1850. No. 2.

P. MINUTISSIMA. *Isothea minutissima* Welw. & Curr. *l. c.* The specimen in the Herb. Brit. Mus. is barren, but the description of the spores, 15 μ in length, and the habit, are those of *Phyllachora*. The stromata are smaller than those of *P. graminis*, its nearest ally.

On the leaves of a species of *Pennisetum* (Marianga), Golungo Alto; Sept., 1855. No. 31.

Dothidella Welwitschii, n. sp. Stroma broadly effused, black, covered by the withered and whitened epidermis; perithecia small, crowded, irregularly oval; spores oblong-elliptical, 15 × 3 μ, hyaline, with a slight yellow tinge.

On the leaves of *Tumboa Bainesii* Hook. f. near Cabo Negro, Mossamedes; Sept., 1859. No. 206.

D. Graphis, n. sp. Stromata gregarious, forming small, black, irregular, elongate spots, rather flat and punctuated by the perithecia; perithecia scattered, small, hemispherical or lentiform; asci ovate-oblong, 33–35 × 10–15 μ; spores colourless, fusiform, 1-septate, 15 × 2 μ.

On the branches of a shrub without flowers or leaves, near Maianga do Povo, Loanda. March, 1854; No. 507.

Microthyrium Millettiæ, n. sp. Perithecia scattered, about ½ mm. in diameter. Asci somewhat ovate, 55 × 35 μ, spores colourless, 2-celled, very large, 35–40 × 10–12 μ.

Golungo Alto. On both surfaces of the leaves of *Millettia Griffoniana* Baill. On the Serra do Alto Queta, towards the river Luinha; July, 1856. No. 223.

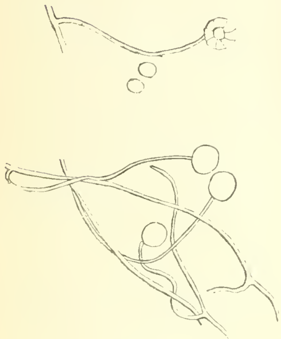
STILBUM SERICEUM and CÆSPITOSUM (Welw. & Curr. *l. c.* p. 291) have been transferred by Saccardo to the genus *Cilicipodium;* but on examining the specimens I find that they correspond more nearly with *Stilbum*.

EXOSPORIUM CELATUM. *Sporidesmium celatum* Welw. & Curr. *l. c.* p. 292, tab. 17, fig. 15. The fungus forms small pustules on the under side of the leaf, which are covered over by the large stellate hairs; it also causes black barren swellings on the corresponding parts of the upper surface. The spores are oblong, slightly tapering towards the obtuse extremities as figured by Currey; they are brown, usually 3 or 4-septate, 35–40 × 10 μ, with a short, thick, colourless pedicel.

On the leaves of *Croton Draconopsis*. Golungo Alto; Oct., 1855.

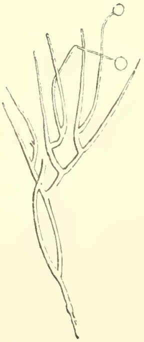
NEW OR RARE BRITISH FUNGI.

By Annie Lorrain Smith.



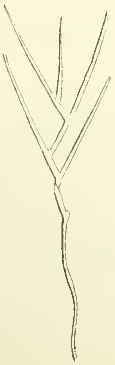
Mortierella repens, n. sp. Mycelium creeping, widely spread, sporangiophores rising from the mycelium, unbranched, slender, slightly tapering, very variable in length; sporangia globose, varying in size from 20 μ in diameter, without any basal collar; spores few, from five upwards, globose, 11 μ in diameter.

Collected by Mr. Jenkin on damp earth, Newport, Monmouth; January, 1897.



M. Bainieri Cost. var. nov. Jenkini A. L. Sm. Sporangiophores about 1 mm. in height, branching in a sympodial manner, tapering from 10 μ in width towards the base to 5 μ below the sporangium, not constricted, and without basal collar; sporangia spherical, about 25 μ in diameter; spores numerous, exceedingly minute, elliptical, 3 × 2 μ, colourless.

Collected by Mr. Jenkin on damp earth at Newport; Jan. 1897.



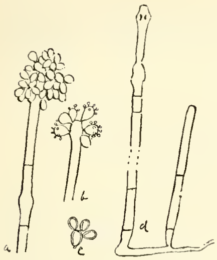
I was inclined to look upon this plant as a new species on account of the absence of basal collar and the exceeding minuteness of the spores, but the branching places it very close to *M. Bainieri*.

I found also on some damp earth sent by Mr. Jenkin another form of *M. Bainieri* with a similar habit of growth, but altogether more robust than the above; the sporangium has a distinct basal collar when the spores are scattered, and the elliptical spores measure 5–6 × 2–3 μ. Along with the sporangia there are very beautiful echinulate stylospores 15–20 μ in diameter, on slender stalks about 40 μ long. Stylospores have not hitherto been recorded for *M. Bainieri*, nor for *M. candelabrum*, a closely-allied species.

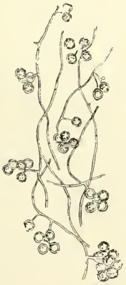
Botrytis angularis A. L. Sm., n. sp. Conidiophores unbranched, pale yellowish, the tip angularly swollen, and producing from the angles swollen bladder-like cells measuring 15 × 10 μ, the stalks continuing to grow and form other heads; spores elliptical oblong, 10 × 6 μ, borne on very small projections on the swollen cells.

On damp moss and earth, Mr. Jenkin, Newport, Mon.; Feb. 1897.

This form of *Botrytis* bears some resemblance to the species figured by Engler & Prantl as the conidial form of *Peziza repanda* in the *Natürlichen Pflanzenfamilien*, Lief. 130, p. 183, but the angular form of the part that bears the bladder-like cells, and the size and shape of the spores, give it quite a distinctive specific character.



Sporotrichum globuliferum Speg. Found by Mr. Pycraft on the flesh of dead birds from America, with which it was doubtless introduced. Hitherto recorded only as growing on dead *Coleoptera* in America.



Sepedonium sepedonioides (Harz) A. L. S. This fungus was also found by Mr. Jenkin along with a culture of some other species on damp cardboard. It is evidently a form of the plant figured and described as *Monosporium sepedonioides* Harz, *Hyphomycetes*, p. 18, T. ii. fig. 3. The spores are globose, coarsely warted, and are rather larger than those of the Harz species, varying from 10 to 15 μ in diameter. The mode of branching and the form and appearance of the spores place it undoubtedly in *Sepedonium*, as Saccardo has already suggested. The plant has not hitherto been recorded for Britain.

Æcidium sp. Pseudoporidia forming small oblong or irregular groups, golden yellow, cylindrical, from $\frac{1}{3}$ to $\frac{1}{2}$ mm. in diameter, the edges becoming torn; spores globose, irregular, 12–17 μ, smooth, contents very granular.

On the leaves of *Suæda maritima*, Shoreham, Sussex; July, 1897.

This may possibly be identical with *Æ. Salicorniæ* DC., but the spores are smaller and smooth.

The following fungi new to Britain were discovered by Mr. D. A. Boyd, Seamill, Ayrshire, who has allowed me to include them here:—

Pseudophacidium Callunæ Karst. On dead branches of *Calluna vulgaris*. West Kilbride; March, 1892.

Stictis stellata Wallr. On dead stems of *Eupatorium cannabinum.* West Kilbride; Nov. 1893.

Thyrsidium Hedericolum Dur. & Mont. var. Carpini Sacc. On dead branch of *Carpinus Betulus.* West Kilbride; Nov. 1895.

Ovularia Bistortæ Sacc. On *Polygonum Bistorta.* Kilmarnock; Aug. 1897.

Ramularia Valerianæ Sacc. On *Valeriana officinalis.* West Kilbride; July, 1897.

SOME NEW CHARACEÆ RECORDS.

By the Rev. G. R. Bullock-Webster.

I have been devoting my spare time during the last two seasons to field-work amongst the *Characeæ* of our Cambridgeshire fenlands, with occasional visits into the neighbouring counties of Norfolk and Suffolk. The fens of North Cambridgeshire, abounding as they do in ditches, drains, lodes, and rivers, supply an almost unlimited hunting ground for all water-plants, but perhaps peculiarly for *Characeæ*, for the extremely fugitive character of some of the species seems to render it practically impossible to exhaust a locality; a ditch or drain carefully searched through a whole season without yielding a single specimen of the order may likely enough another year produce a plentiful supply. This is peculiarly the case with the Tolypellas. Indeed, it would, I think, be true to say that these are seldom found in the same spot two years in succession; moreover, their growth and decay are so rapid that unless their temporary habitat be discovered during the fortnight or three weeks of their season, it becomes very difficult to detect them at all.

West Norfolk seems to have been very little worked for the *Characeæ*, though it embraces a fenland area which well repays examination. So far, Messrs. Groves's census has only recorded three species from the vice-county—*Chara vulgaris* L., *Chara fragilis* var. *Hedwigii* Kuetz., and *Tolypella glomerata* Leonh. To these I was able to add last summer *Chara fragilis* Desv. and *C. hispida* L., collected in ditches near the Little Ouse, in the parish of St. John's, Little Ouse, *C. aspera* Willd. in one of the meres in the Breck district, north of Thetford, *C. polyacantha* Braun in Garboldisham Fen, and *C. vulgaris* var. *longibracteata* Kuetz. in the counterwash drain near Welney. But the more interesting West Norfolk yields were *Nitella flexilis* Agardh and *N. mucronata* Kuetz. from the Little Ouse, and *Tolypella prolifera* Leonh., which I collected in excellent condition in three separate stations—along the Norfolk bank of the Little Ouse, in a drain near Southery, and in a ditch near the counterwash drain at Welney.

I visited the neighbourhood of Lowestoft early in July, with a view to collecting specimens of *Chara canescens* from the ground where Messrs. Salmon had found it in 1896, and the locality of which they were kind enough to indicate to me. I was only able, after careful search, to discover one solitary specimen—an instance of *Chara* fugitiveness—but near by I came upon an abundant growth of *Chara connivens* Braun, a new and interesting record for East Suffolk. So far, *C. connivens* has had only three known stations in Great Britain. A few days later I visited the neighbourhood of Beccles, and found in Gillingham Marsh, which lies in the extreme S.E. corner of East Norfolk, two or three very small specimens of *Tolypella prolifera* Leonh.

But I think perhaps the most noteworthy discovery has been in the Waveney Fens, East Norfolk. In Mr. Borrer's herbarium at Kew is a specimen of *Nitella tenuissima* Kuetz., stated to have been collected at "Roydon fen Cambridge Oct. 1852." There is no Roydon Fen in Cambridgeshire, so far as I can ascertain (and I have consulted more than one of our fen sages), but there is a Roydon Fen in East Norfolk, near Diss. There are therefore only two interpretations of Mr. Borrer's label. If "Roydon fen" is to stand, then Norfolk must be substituted for Cambridge; or if "Cambridge" is correct, then for "Roydon" we must probably read "Bottisham," in which fen *N. tenuissima* has been known to grow since the early part of this century. Authorities have been rather in favour of the latter interpretation, I think. I visited Roydon Fen on August 18th, and made a careful search without result, so far as *N. tenuissima* was concerned. But a few weeks later (Sept. 27th), whilst collecting Charas in one of the fens lying two or three miles higher up the Waveney, I came upon some excellent specimens of this plant growing in the shallow turf-holes which it loves. It is possible, therefore, that Mr. Borrer found *N. tenuissima* in Roydon Fen, Norfolk, in the year 1852, and that this is only a rediscovery. On the other hand, it seems difficult to believe that, if Mr. Borrer discovered *N. tenuissima* in East Norfolk, he should not have communicated the fact to Prof. Babington, with whom he was in constant communication, as the recently published Journal of the Professor shows. Five editions of the *Manual of British Botany* were issued after 1852, and one of these at least previous to Mr. Borrer's death, yet in none of these editions is any reference made to *N. tenuissima* being found elsewhere than in "peaty ditches in the Fens of Cambridgeshire." Moreover, it is worthy of remark that Prof. Babington's Journal records under Aug. 18th, 1852: "Mr. Borrer . . . . having come yesterday, we went to Bottisham where he wanted to see *Viola stagnina* now in seed" (p. 164). This was the very year of his collecting his "Roydon fen Cambridgeshire" plant; and this spot which he visited with the Professor for *Viola stagnina* was also the very station for *Nitella tenuissima*, as is proved from the same Journal under July 16th, 1850: "Coleman, Newbould and I went to Bottisham fen, and found *Viola stagnina* in fruit in plenty also *Chara tenuissima*" (p. 155).

When Mr. Sanders, or rather Mr. C. H. Davis, discovered *Nitella mucronata* Kuetz. in the Ouse, near Bedford, in 1882, it was natural to look for its appearance in the same river as it passed through Cambridgeshire. Both last summer and in 1896 I made diligent search without success. Mr. Alfred Fryer's keen eye has also been on the watch for many seasons with the same object. The discovery of the plant in West Norfolk led me to refer to my specimens of Nitellas collected in Cambridgeshire in 1895, and amongst them I found *Nitella mucronata* put away amongst some unidentified specimens. It was collected in a waterway leading into the Ouse just below Ely. Messrs. Groves, who have been good enough to verify all the gatherings which I have quoted, refer to this plant as larger than any British specimens which they had seen; its size had deceived me into regarding it as *N. opaca* or *N. flexilis*, whilst the absence of fruit precluded me (I thought) from deciding between the two.

I have one or two other new records still to mention—*Chara fragilis* var. *capillacea* Coss. & Germ., from the Haddenham Clay-pits near Ely, and *Tolypella prolifera* Leonh., from the Canal at Oxford, both in 1896. These new records for *T. prolifera* considerably enlarge the area of distribution of that fickle plant. So far Sussex, Lincolnshire, Hunts, Cambs, and Northants have been its only recorded vice-counties; now we may add East Norfolk, West Norfolk, Oxfordshire, and, as Mr. Druce's *Flora of Berkshire*, just issued, records, a station from that county.

Whilst speaking of *Tolypella prolifera*, I should like to mention the extraordinary crop of this plant which appeared last summer in the Old West River, near Stretham, Cambs. It came to perfection about June 25th, and then showed itself in a thick bed fringing the bank of the river, just below the surface of the water. It did not extend into the bed of the river, preferring the shallower water, where it produced somewhat short barren branchlets, and densely compacted fruiting heads. How far it extended I cannot say—I left it after tracing it for a mile or more.

As regards *N. mucronata*, its eventual discovery in the Great Ouse, in Cambridgeshire, was to be expected, but the record from West Norfolk brings it into an entirely independent locality. It was growing very sparingly, though the specimens are very luxuriant. I hope to be able to collect it in better fruiting state next season, but it is more than probable that no sign of its existence in any of our waters will be discernible.

SOME COUNTY LISTS OF MOSSES.

By H. N. Dixon, M.A., F.L.S.

The herbarium of the late H. Boswell, which has recently passed into the possession of the Oxford University, contained the voucher specimens of mosses sent to him as referee (for Musci) of the Botanical Record Club. Mr. Boswell had drawn up from these specimens basis-lists for thirteen vice-counties, which were duly published in the Reports of the Botanical Record Club. A considerable number, however, remained, and these have been submitted to me for examination. They represent some twenty vice-counties, additional to those referred to above; some of these are very fairly represented, others very poorly. Some of the packets have evidently been examined, verified, and corrected where necessary, by Mr. Boswell; others have clearly not been touched, and these I have examined.

Of the counties or vice-counties represented, there are several for which lists of mosses have already been published; some in the *Phytologist*, the *Journal of Botany*, and similar publications, others in the *Transactions* of local scientific societies. In other cases nothing has apparently been recorded, and it seems desirable that such lists should be published as a basis for future work. The Botanical Record Club has for several years ceased to publish Reports, and, this being the case, this Journal seems the most suitable medium for the publication of these lists. They have been arranged for publication by Mr. E. Charles Horrell, who has added to them a few additional records which were in his possession.

North Essex (v.-c. 19).

Collected by H. N. Dixon, unless otherwise noted. H. F. P. = H. F. Parsons. Some of these records were not sent to the Bot. Record Club, but are added by H. N. Dixon. In this list there are ninety-three species and three varieties:—

Sphagnum cymbifolium Ehrh. — *rigidum* Schpr. — *subsecundum* Nees. — *acutifolium* Ehrh. — *cuspidatum* Ehrh.
Catharinea undulata W. & M. — *angustata* Brid.
Polytrichum nanum Neck.—*aloides* Hedw. — *piliferum* Schreb. — *juniperinum* Willd. — *commune* L.
Pleuridium subulatum Rabenh.
Ceratodon purpureus Brid.
Dicranella heteromalla Schp.
Dicranoweisia cirrata Lindb.
Campylopus pyriformis Brid.
Dicranum scoparium Hedw.
Leucobryum glaucum Schp.
Fissidens viridulus Wahl. — *incurvus* Starke.—*bryoides* Hedw. —*taxifolius* Hedw.
Grimmia pulvinata Sm. (H. F. P.) —*commutata* Hüb.
Phascum cuspidatum Schreb.
Pottia truncatula Lindb. — *intermedia* Fürnr.—*minutula* Fürnr.
Tortula muralis Hedw.—*subulata* Hedw.—*mutica* Ldb.—*lævipila* Schwgr. — *ruralis* Ehrh. — *papillosa* Wils.
Barbula tophacea Mitt. —*fallax* Hedw. (H. F. P.) — *cylindrica* Schp.—*revoluta* Brid. (H.F.P.) —*unguiculata* Hedw.
Weisia viridula Hedw.
Zygodon viridissimus R. Br. (H. F. P.)
Orthotrichum Lyellii H.& T.—*affine* Schrad. — *diaphanum* Schrad. (H. F. P.)
Ephemerum serratum Hpe.
Physcomitrium pyriforme Brid.
Funaria hygrometrica Sibth.
Aulacomnium androgynum Schwgr. —*palustre* Schwgr.
Bartramia pomiformis Hedw.
Leptobryum pyriforme Wils.
Webera carnea Schp. (H. F. P.)
Bryum pallens Sw.—*intermedium* Brid.—*cæspiticium* L. (H.F.P.) —*capillare* L. (H. F. P.)—*erythrocarpum* Schwgr. — *argenteum* L.
Mnium cuspidatum Hedw. — *rostratum* Schrad.—*undulatum* L. —*hornum* L.
Fontinalis antipyretica L.
Neckera complanata Hübn.
Homalia trichomanoides Brid.

Leucodon sciuroides Schwgr.
Porotrichum alopecurum Mitt.
Leskea polycarpa Ehrh.
Anomodon viticulosus H. & T.
Thuidium tamariscinum B. & S.
Isothecium myurum Brid.
Pleuropus sericeus Dixon.
Camptothecium lutescens B. & S.
Brachythecium albicans B. & S.—*rutabulum* B. & S. (H. F. P.)—*velutinum* B. & S.—*purum* Dixon
Eurhynchium piliferum B. & S.—*prælongum* Hobkirk. (H. F. P.)—*striatum* B. & S.—*rusciforme* Milde.—*confertum* Milde.
Plagiothecium denticulatum B. & S.
Amblystegium serpens B. & S. (H. F. P.)—*filicinum* De Not.
Hypnum riparium L. — *aduncum* var. *Kneiffii* Schp.—*fluitans* L. —*cupressiforme* L.—var. *resupinatum* Schp. (H. F. P.) — var. *ericetorum* B. & S.—*cuspidatum* L.—*Schreberi* Willd.
Hylocomium squarrosum B. & S.—*triquetrum* B. & S.

Denbighshire (v.-c. 50).

Collected by H. F. Parsons, where no initials are appended, and by J. Harbord Lewis (J. H. L.). This list contains sixty species and four varieties:—

Sphagnum cymbifolium Ehrh. — *subsecundum* Nees.—var. *contortum* Schpr.—*acutifolium* Ehrh.
Andreæa Rothii W. & M.
Oligotrichum incurvum Lindb.
Polytrichum alpinum L. (Miss Armitage). — *piliferum* Schreb.— *commune* L.
Ditrichum flexicaule var. *densum* Braithw.
Dicranella rufescens Schp.
Dicranoweisia cirrata Lindb.
Campylopus flexuosus Brid.—*fragilis* B. & S.
Dicranum Bonjeani De Not.—*fuscescens* Turn.
Leucobryum glaucum Schp.
Grimmia apocarpa var. *rivularis* W. & M. — *pulvinata* Sm. — *patens* B. & S.—*Doniana* Sm.
Rhacomitrium aciculare Brid. — *fasciculare* Brid.—*heterostichum* Brid. (Miss Armitage). — *lanuginosum* Brid.
Ptychomitrium polyphyllum Fürnr.
Barbula spadicea Mitt.
Trichostomum tortuosum Dixon.
Encalypta streptocarpa Hedw.
Zygodon Mougeotii B. & S.
Orthotrichum anomalum var. *saxatile* Milde.
Aulacomnium palustre Schwgr.
Bartramia pomiformis Hedw.
Philonotis fontana Brid.—*calcarea* Schp.
Breutelia arcuata Schp.
Bryum bimum Schreb. (J. H. L.) —*capillare* L.
Mnium rostratum Schrad.—*undulatum* L.—*hornum* L.—*punctatum* L. (J. H. L.)
Fontinalis antipyretica L.
Neckera crispa Hedw.—*complanata* Hübn.
Leucodon sciuroides Schwgr.
Porotrichum alopecurum Mitt.
Anomodon viticulosus H. & T.
Thuidium tamariscinum B. & S.
Climacium dendroides W. & M.
Isothecium myurum Brid.
Brachythecium rutabulum B. & S. (J. H. L.)—*populeum* B. & S.
Eurhynchium tenellum Milde (J. H. L.).—*rusciforme* Milde (J. H. L.).—*confertum* Milde (J. H. L.)
Plagiothecium Borrerianum Spr. (J. H. L.)—*denticulatum* B. & S. (J. H. L.) — *sylvaticum* B. & S. (J. H. L.) — *undulatum* B. & S. (J. H. L.)
Hypnum uncinatum Hedw.—*commutatum* Hedw.
Hylocomium loreum B. & S. — *splendens* B. & S.

MONMOUTH (V.-C. 35).

Collected by Rev. A. Ley, unless otherwise stated. This list contains ninety-three species and seven varieties:—

Sphagnum cymbifolium Ehrh.—*papillosum* Lindb.—*subsecundum* var. *contortum* Schp.—*subsecundum* var. *turgidum* C. M.—*subsecundum* var. *obesum* Schp.—*acutifolium* var. *deflexum* Schp. *intermedium* Hoffm.—*cuspidatum* var. *plumosum* N. & H.

Tetraphis pellucida Hedw.

Polytrichum nanum Neck.—*aloides* Hedw.—*urnigerum* L.—*juniperinum* Willd.

Diphyscium foliosum Mohr.

Pleuridium subulatum Rab. (Miss Armitage).

Ditrichum homomallum Hpe.

Swartzia montana Lindb.

Seligeria recurvata B. & S.

Ceratodon purpureus Brid.

Rhabdoweisia fugax B. & S.

Dichodontium pellucidum Schp.

Dicranella varia Schp.

Blindia acuta B. & S.

Campylopus flexuosus Brid.

Dicranum Bonjeani De Not.

Fissidens viridulus Wahl.—*incurvus* Starke.—*bryoides* Hedw.—*taxifolius* Hedw.

Grimmia trichophylla Grev.

Rhacomitrium ellipticum B. & S.—*lanuginosum* Brid.

Ptychomitrium polyphyllum Fürnr.

Phascum cuspidatum Schreb.

Pottia truncatula Lindb.—*minutula* Fürnr.

Tortula muralis var. *rupestris* Wils.—*lævipila* Schwgr.

Barbula fallax Hedw.—*cylindrica* Schp.—*vinealis* Brid.—*sinuosa* Braithw.—*unguiculata* Hedw.

Weisia rupestris C. M.—*verticillata* Brid.

Trichostomum crispulum Bruch.—*mutabile* Bruch.—*nitidum* Schp.

Cinclidotus fontinaloides P. Beauv.

Zygodon Mougeotii B. & S.

Aulacomnium palustre Schwgr.

Bartramia ithyphylla Brid.—*pomiformis* Hedw.—*Halleriana* Hedw.

Philonotis fontana Brid.

Breutelia arcuata Schp.

Webera elongata Schwgr.—*cruda* Schwgr.—*carnea* Schp.—*albicans* Schp.

Plagiobryum Zierii Lindb.

Bryum inclinatum Bland.—*pallens* Sw.—*pseudotriquetrum* Schwgr.—*capillare* L.

Mnium rostratum Schrad.—*undulatum* L.—*serratum* Schrad.—*stellare* Reich.

Homalia trichomanoides Brid.

Heterocladium heteropterum B. & S.

Brachythecium rutabulum B. & S.—*velutinum* B. & S.—*plumosum* B. & S.—*illecebrum* De Not.

Hyocomium flagellare B. & S.

Eurhynchium crassinervium B. & S.—*prælongum* Hobk.—*Swartzii* Hobk.—*Teesdalei* Schp.—*striatum* B. & S.—*rusciforme* Milde.—*confertum* Milde.

Plagiothecium pulchellum B. & S.—*denticulatum* B. & S.—*sylvaticum* B. & S.

Amblystegium serpens B. & S.—*fluviatile* B. & S.

Hypnum stellatum Schreb.—*chrysophyllum* Brid.—*fluitans* L.—*revolvens* Sw.—*cupressiforme* var. *resupinatum* Schp.—*Patientiæ* Lindb.—*molluscum* Hedw.—*palustre* L.—*cordifolium* Hedw.—*cuspidatum* L.—*Schreberi* Willd.

Hylocomium loreum B. & S.

Pembrokeshire (v.-c. 45).

Collected by H. F. Parsons or by Miss Armitage. This list contains fifty-one species:—

Sphagnum subsecundum Nees.
Catharinea undulata W. & M.
Polytrichum juniperinum Willd.—*commune* L.
Fissidens adiantoides Hedw.—*taxifolius* Hedw.
Rhacomitrium aciculare Brid.
Tortula pusilla Mitt. — *aloides* De Not. — *muralis* Hedw. (Miss Armitage).—*lævipila* Schwgr. — *intermedia* Berk. — *ruraliformis* Dixon (Miss Armitage).
Barbula rubella Mitt. — *fallax* Hedw. — *vinealis* Brid. (Miss Armitage)—*unguiculata* Hedw. —*convoluta* Hedw.
Weisia viridula Hedw.
Cinclidotus fontinaloides P. Beauv.
Encalypta vulgaris Hedw.—*streptocarpa* Hedw.
Orthotrichum diaphanum Schrad.
Breutelia arcuata Schp.
Webera carnea Schp.
Bryum cæspiticium L. — *capillare* L. (Miss Armitage) — *atropurpureum* W. & M. (Miss Armitage)—*argenteum* L.
Mnium rostratum Schrad.—*hornum* L.
Neckera complanata Hübn.
Porotrichum alopecurum Mitt.
Anomodon viticulosus H. & T. (Miss Armitage).
Thuidium tamariscinum B. & S.
Camptothecium lutescens B. & S. (Miss Armitage)
Brachythecium albicans B. & S.—*rutabulum* B. & S. — *purum* Dixon (Miss Armitage).
Eurhynchium prælongum B. & S. —*Swartzii* Hobk. — *tenellum* Milde (Miss Armitage).—*striatum* B. & S. — *murale* Milde (Miss Armitage). — *rusciforme* Milde.—*confertum* Milde.
Amblystegium filicinum De Not.
Hypnum stellatum Schrad. — *cupressiforme* L. — *scorpioides* L. —*cuspidatum* L.

ANEMOPÆGMA CARRERENSE, sp. n.

By Eleonora Armitage.

Among the plants of a collection which I made in the West Indies in 1895 and 1896 are specimens of a new Bignoniacea of the genus *Anemopægma*, which may be diagnosed as follows:—

Anemopægma carrerense, sp. n. *A. racemoso* Mart., valde affinis; prophyllis ovatis vel ovato-lanceolatis inter alia differt.

Frutex scandens. Rami teretes, striati, juniores sparse pubescentes, dein cito internodiis diu nodis glabrescentes, ad nodos compressi. Folia opposita, foliolis 2 ovatis sæpe breviter acuminatis basi plicatis apice obtusis vel subacutis, 6 cm. longis, 3·5 cm. latis, utrinque saturate viridibus glabris; petiolus supra compressis, sparse pilosus, ad 7 mm. longus; cirrhus terminalis apice 3-hamatus. Inflorescentia 3–6-flora, pedunculo ad 6 cm. longo, pedicellis 6 mm. longis; prophylla ovata vel ovato-lanceolata, apice et basi acuta vel obtusa, 4 mm. longa; bracteæ minutæ subulatæ. Calyx campanulatus, glaber, margine undulatus, 5 mm. longus. Corolla pallide citrina, 6 cm. longa, e tubo basali subrecto, 15 cm. longo, ampliata, ad staminum insertionem puberula, undique pilis minutis glanduliferis dense conspersa, lobis latis emarginatis. Stamina inclusa, curvata, basi puberula. Ovarium oblongum. Discus conicus. Fructus compressus, utrinque bibullatus, ovalis, basi et apice acutus, 7·5 cm. longus, 3·7 cm. latus; septum apice bicorne velutsi morsum. Semina, alis inclusis, 2·5 cm. lata, 2 cm. longa; cotyledones basi et apice profunde emarginatæ, 1·3 cm. latæ, 8 mm. longæ.

Hab. Trinidad: Island of Carrera, in the Gulf of Paria, where the plant climbs over shrubs to a height of 5 or 6 ft. Here I collected it in flower and fruit in April, 1896, and the Superintendent of the Botanic Garden, Mr. J. H. Hart, has since found it there, both in flower and fruit, in September; without precise locality, *Fendler* (No. 518 in Herb. Kew). Venezuela: near the mouth of the Orinoco, *Rusby* (in Herb. Coll. of Pharmacy, New York).

I have sent seeds of the plant to the Royal Gardens, Kew, where they have germinated. I have to thank Mr. I. H. Burkill, F.L.S., for help in determining and diagnosing the plant for me.

THE NOMENCLATURE OF ARENARIA ULIGINOSA.

[Dr. B. L. Robinson publishes in the *Botanical Gazette* for March last some notes on "New species and extended ranges of North American *Caryophyllaceæ*," in the course of which he deals with the nomenclature of *Arenaria uliginosa* Schleich. This being a British plant, it seems worth while to reprint here Dr. Robinson's remarks, which contain some interesting criticisms of the *Index Kewensis* and of the practical working of the Madison amendment of the "Rochester Code." We are entirely at one with Dr. Robinson in his condemnation of this amendment, and in his estimate of the mischievous results which would follow its general adoption.—Ed. Journ. Bot.]

This species, long known, although somewhat local, in alpine and boreal regions of Europe, as well as in Siberia and Greenland, has been collected on slaty detritus near Rama, northern Labrador, at about 300^{m} altitude, by Mr. J. D. Sornborger, August, 1897. While the species appears in Watson's *Bibliographical Index*, under the name *A. stricta*, it has not, to the knowledge of the writer, been hitherto observed upon continental America, its citation in the *Index* being due to the fact that Dr. Watson included Greenland in the territory covered, as well as to the circumstance that he included in his synonymy of the species in question the quite different *A. Rossii* R. Br. *A. uliginosa* can readily be distinguished from any of the related North American species by its foliage closely tufted at the base and by its very long and slender almost naked stems and peduncles. In these, as in all other observed characters, Mr.

Sornborger's specimens correspond exactly with those from the Old World. The nature of the occurrence in Labrador, together with the presence of the species in Greenland, leaves little doubt as to the indigenous character of the Labrador specimens.

This species has a rather complicated synonymy, which has led to so much confusion that it will be best to cite its bibliography here in some detail. Its names have been as follows:—

Spergula stricta Swartz, Vet. Acad. Handl. Stockh. 20, 229 (1799); and in Schrad. Journ. 1800^2, 256.

Arenaria uliginosa Schleicher, "Cent. exs. 1, n. 47," acc. to Lam. & DC. Fl. Fr. iv. 786 (1805), where a good description is given; DC. Ic. Pl. Gal. Rar. 14 (excl. syn. in part), pl. 46; and Prodr. i. 407; Hook. f. Arct. Pl. 287, 322; Gray, Proc. Acad. Philad. 1863, 58; Hook. f. Stud. Fl. Brit. Is. ed. 3, 63; Britton, Mem. Torr. Club, ii. 37.

Alsine stricta Wahlenberg, Fl. Lapponica, 127 (1812); Fl. Dan. pl. 2962; Nyman, Conspect. 118; and continental authors generally.

Arenaria lapponica Spreng. Syst. ii. 402 (1825); Hook. f. & Jacks. Ind. Kew. i. 179.

Sabulina stricta Reichenb. Fl. Germ. Excurs. 789 (1839).

Stellaria stricta Sw. ex Steudel, Nomencl. ed. 2, ii. 637 (1841).

Arenaria stricta Wats. Bibliog. Index, 98 (1878), at least as to the first three synonyms.

From the above synonymy it is evident that there is a considerable choice of names, and that the selection by different authors is likely to vary somewhat according to individual ideas of classification and nomenclature. It is clear, however, that those who unite *Alsine* and *Arenaria* and who also prefer the "first correct combination" must choose *Arenaria uliginosa*, the name current in England, It is to be regretted that the statements made in regard to this species in the *Index Kewensis* are most conflicting and inaccurate, being as follows:—

Under *Alsine*
    A. stricta Mert. & Koch, in Roehl. Deutschl. Fl. iii. 278 = Ar. stricta.
    A. stricta Wahlenb. Fl. Lapp. 127 = Ar. lapponica.
Under *Arenaria*
    A. lapponica Spreng. Syst. ii. 402.—Lappon. (given as a valid species of restricted range).
    A. uliginosa Schleich. ex Schlecht. in Ges. Naturf. Fr. Berl. Mag. vii. (1813) 207 = Arenaria stricta.
Under *Sabulina*
    S. stricta Reichenb. Fl. Germ. Excurs. 789 = Arenaria stricta.
Under *Spergula*
    S. stricta Sw. in Vet. Acad. Handl. Stockh. xx. (1799) 229 = Arenaria stricta.

Now of these six clear references to this well-known European plant all are incorrect. Four refer it to *Arenaria stricta*, but the only plant of that name cited by the *Index Kewensis* is the common and wholly distinct American species of Michaux's Fl. Bor. Am. 1, 274, while the other two references to the plant under discussion maintain for it the name *Arenaria lapponica* Spreng. (1825), which is much antedated both in *Arenaria*, *Alsine*, and *Spergula*, and is accordingly supported by no code or usage whatever. As further incidents in this confusion may be mentioned the neglect of Lamarck & De Candolle's early publication of *Arenaria uliginosa*, and the omission of Watson's *Arenaria stricta*, which, as its synonymy clearly shows, was employed in a sense wholly different from *A. stricta* of Michaux.

In 1890 (Mem. Torr. Club, ii. 37) Dr. N. L. Britton exactly expresses the position of the present writer, by his footnote, which runs as follows:—

"*Arenaria stricta*, S. Wats., Bibliog. Index, Polypet. 98 (1878), is based on *Spergula stricta*, Sw. Act. Holm, xx. 229 (1799), which is *Alsine stricta*, Wahl. Fl. Lapp. 127 (1812), and the oldest name available for it appears to be *Arenaria uliginosa* Schleich. Dr. Watson's binomial of 1878 can in no way displace Michaux' of 1803."

This position, stated so positively by Dr. Britton in 1890, is of course quite contrary to the unwise Madison rule of 1893, which asserts the immutability of an older specific name even when the species is transferred to a genus already containing an identical specific name of later date. As the writer has elsewhere shown, this provision, together with the dictum of "once a synonym always a synonym," would give a power to any thoughtless worker of displacing for ever many valid specific names. Such a rule can certainly never attain general acceptance, and it is a pleasure to see from Dr. Britton's note of 1890 how clearly he sees its disadvantages. Nevertheless it is a matter of surprise to note that he did not feel impelled to follow the Madison rules in the *Illustrated Flora*, or even in the *List of Pteridophyta*, &c. (which was expressly prepared to illustrate the nomenclatorial system of the American Association), for in both works *Arenaria stricta* Michx. is still kept up, although the Madison rule would clearly establish *Arenaria stricta* (Sw.) Wats. for the European plant, and force the adoption of *A. Michauxii* Fenzl for the American. Dr. Britton's usage can scarcely be due to oversight, for he had so recently shown a complete understanding of the existence and distinctness of the two species concerned. But if, on the other hand, it is to be taken as a very sensible exception to an undesirable rule, it may be asked: What is to become of a rigid system, if even very sensible exceptions are permitted?

BIOGRAPHICAL INDEX OF BRITISH AND IRISH BOTANISTS.

By James Britten, F.L.S., and G. S. Boulger, F.L.S., F.G.S.

First Supplement (1893–97).

(Continued from p. 149.)

Edwards, Thomas (fl. 1597). "Apothecarie in Excester, learned and skilfull . . . in the knowledge of plants." Introduced *Yucca gloriosa*. Ger. 89, 143, 1359.

Fisher, Henry S. (d. 1881): d. Liverpool, 18 March, 1881. Memb. Bot. Exchange Club. Found (with F. M. Webb) *Rosa Jundzilliana*. 'Flora of Liverpool,' published by Liverpool Nat. Field Club, 1872. Contrib. papers to Field Club Reports. R.S.C. ii. 627 ; vii. 668.

Forster, George (1754–94): b. Nassenhuben, near Dantzic, Prussia, 26 Nov. 1754 ; d. Paris, 11 Jan. 1794. Son of J. R. Forster. Accompanied his father to Russia and England and on Cook's second voyage. Prof. Nat. Hist. Cassel, 1779. President Univ. Mentz. 'Characteres' . . . (with J. R. Forster), 1776. 'Florula Insularum Australium Prodromus,' 1786. 'Works,' with biogr., Leipsic, 1843. Plants at Brit. Mus. and Kew. Drawings in Bot. Dep. Mus. Brit. Rees ; Pritz. 110 ; Jacks. 547 ; Lasègue, 365 ; Journ. Bot. 1885, 360.

Forster, John Reinhold (1729–98): b. Dirschaw, Polish Prussia, 22 Oct., 1729 ; d. Halle, 9 Dec., 1798. D.C.L. Oxon, 1775. M.D., Halle, 1781. Came to England, 1766. Taught at Warrington Academy. Naturalist to Cook's second voyage, 1772–5. Prof. Nat. Hist. and Inspector Bot. Garden, Halle, 1780. 'Characteres Genera Plantarum,' 1776 (with George Forster). 'Enchiridion,' 1788. Letters in Banks Corresp. Drawings in Bot. Dep. Mus. Brit. Pl. in Herb. Mus. Brit. and at Kew. Rees; Pritz. 110 ; Jacks. 547 ; Lasègue, 324, 365 ; Journ. Bot. 1885, 360. *Forstera*, L. fil.

Fox, Henry Stephen (1792–1846): b. Chatham, Kent, 1792 ; d. Washington, U.S.A., October, 1846. Brit. Minister at Buenos Ayres, Rio Janeiro, and Washington. Uncle of Sir C. J. Fox Bunbury. Had a herbarium formed at Rio, Monte Video, Porto Alegre, &c., 1831–3. Plants in Bunbury's Herb. at Cambridge. C. J. F. Bunbury's 'Botanical Fragments,' i. 59, 358, &c. Alumn. Oxon.

Frampton, Mary (1773–1846): b. Moreton, Dorset, 1773 ; d. Dorchester, Dorset, 12 Nov., 1846. Five vols. of drawings of Dorset plants in possession of H. Frampton, of Moreton 'Journal of M. F., 1779–1846.' Fl. Dors. 39 ; Salter, Bot. of Poole, 33.

Garth, Richard (d. before 1605). Of Drayton, South Hants. Senior clerk in the Diplomatic Service. "Historiæ Plantarum, cum Indicarum, tum inquilinarum studiosissimus." Lobel, Advers. 469; Illust. 85.

Gibbes, Rev. Heneage (1802?–87): b. Bath, 1802; d. Mutley, Plymouth, 18 March, 1887. M.B., Camb., 1826. L.R.C.P., 1829. Incumbent of All Saints', Sidmouth, 1847. Rector of Bradstone, Devon, 1870–83. MS. Flora of Bath, used by Babington. 'Flora Bathoniensis,' pref. vi. Found *Euphorbia pilosa*, 1834, Bab. Fl. Bath, 44. Alumn. Oxon. 'Memorials of C. C. Babington,' xxii. xxxii; Munk, iii. 14.

Glanville, Bartholomæus De, *alias* **Bartholomæus Anglus** (fl. 1230–1250). Franciscan friar. Related to the Earls of Suffolk (?). 'De proprietatibus rerum' (dealing in part with plants), trans. 1398 by John de Trevisa, printed by Wynkyn de Worde. Twelve editions printed between 1479 and 1494. Ames' 'Dibdin,' ii. 310–321; Stephen Robson, 'Brit. Flora,' pref. p. iv; Dict. Nat. Biog. xxi. 409.

Gordon, Rev. George (1801–93): b. Urquhart, 1801; d. Braebirnie, Elgin, 12 Dec., 1893. Minister of Birnie, near Elgin, 1832–89. LL.D. 'Collectanea for a Flora of Moray,' 1839. MS. Flora of Moray in Bot. Dep. Mus. Brit. Discovered *Pinguicula alpina* in 1831. Eng. Bot. 2621, 2747. R.S.C. ii. 945 (excl. nos. 3–6); vii. 800; x. 28. Pritz. 126; Jacks. 257; Journ. Bot. 1894, 64, 160; Top. Bot. 546; N. B. G. 498, 508; Gard. Chron. 1893, ii. 809; Ann. Scott. Nat. Hist. 1894, 65, with portr.

Gosselin, Joshua (1739–1813): b. Guernsey, 6 Nov. 1739; d. Bengeo Hall, Herts, 27 May, 1813; bur. Bengeo. 'Flora Sarniensis' (prepared 1788) in Bury's Hist. of Guernsey (1813).

Gough, Thomas (1804–80): b. Middleshaw, Westmoreland, 30 Nov. 1804; d. Kendal? 17 July, 1880. Son of John Gough. Surgeon in Kendal. List of pl. in Nicholson's Annals of Kendal, 1835. Bot. notices in Wordsworth's 'Scenery,' 1842. Westmoreland Note-book, 1889, 109, with portr.; Macpherson's 'Fauna of Lakeland,' 1892, xxii.; 'Naturalist,' 1894, 295; Alumn. Oxon.

Graham, G. J. (d. before 1839). Collected in Mexico and introduced many Mexican pl., and sent dried pl. to Kew. 'Plantæ Hartwegianæ,' pref. iv.; Bot. Mag. 1356, 1370. *Salvia Grahami* Benth.

Gregg, Mary, *née* **Kirby** (1817–93): b. Leicester, 27 April, 1817; d. Brooksby, 15 Oct. 1893; bur. Brooksby; m. Rev. H. Gregg, 1 Aug. 1860. 'Flora of Leicestershire,' 1847, 1850 (notes by Elizabeth Kirby). 'Plants of the Land and Water' (with E. K.), 1857. 'Chapters on Trees' (with E. K.), 1873. 'Leaflets from my Life' (narrative autobiography), 1887. Pritz. 164; Jacks. 566; R.S.C. iii. 658; Phyt. iii. 157, 179.

Grigor, James (1811?–1848): b. 1811?; d. Norwich, 22 April, 1848. Nurseryman. 'Eastern Arboretum,' 1841. Dict. Nat. Biog. xxiii. 248.

Grindal, Rev. Edmund (1519?–83): b. St. Bees, Cumberland, c. 1519; d. Croydon, 6 July, 1583; bur. parish church, Croydon.

B.A., Camb., 1538. M.A., 1541. D.D., 1564. Bishop of London, 1559. Archbishop of York, 1570; of Canterbury, 1575. Introduced *Tamarix* circ. 1582. 'Life' by Strype; Dict. Nat. Biog. xxiii. 261.

Hamerton, Philip Gilbert (1834–94): b. Laneside, Lanc., 10 Sept. 1834; d. Paris, 4 Nov. 1894. LL.D., Aberdeen, 1894. Artist. Had a herbarium from about 1870. 'Autobiography,' with portr., 1897.

Hancorn, Philip (fl. 1797). In the Portuguese navy. Chief of the fleet in Brazil in 1797. "Rerum naturalium studiosus . . . etiam studiosorum fautor," Gomes, Memorias dos Corresp. (1812), 51. Journ. Bot. 1896, 250. *Hancornia* Gomes.

Harker, James Allen (1847–94): b. 31 July, 1847; d. Cirencester, Gloucester, 19 Dec. 1894. F.L.S., 1883. Prof. Nat. Hist., Royal Agric. Coll., Cirencester, 1881–94. MS. Flora of Gloucestersh. (with G. S. Boulger). Studied grasses, variation in *Ophrys apifera*, &c. R.S.C. x. 142; Proc. Linn. Soc. 1894–5, 32.

Hartweg, Carl Theodore (1812–71): b. Carlsruhe. 18 June, 1812; d. Swetzingen, Baden, 3 Feb. 1871. Collector for Hort. Soc. in Mexico, 1836–7; in California, 1846–7. Director of Grand Ducal Gardens at Swetzingen. 'Journal' (California), Hort. Soc. Journ. i.–iii. 'Notes' (Mexico), Trans. Hort. Soc. iii. 115–162. First set of plants at Kew. Jacks. 556; Bot. of California, ii. 556; Bot. Biol. Centrali-Americana, iv. 126; Journ. Bot. 1871, 224; R.S.C. iii. 203. Bentham, 'Plantæ Hartwegianæ,' 1839–57. *Hartwegia* Lindl.

Hassall, Arthur Hill (1817–94): b. Teddington, Middlesex, 13 Dec. 1817; d. San Remo, 9 April, 1894. M.R.C.S., 1839. Public Analyst. Contrib. to Ann. Nat. Hist., 1842. 'History of Brit. Freshwater Algæ,' 1845. Pritz. 137; Jacks. 242; R.S.C. iii. 208; vii. 918. 'Narrative of a Busy Life,' 1893. Journ. Bot. 1894, 191. *Hassallia* Berk. = *Stigonema*.

Hawker, Rev. William Henry (fl. 1830–80). Of Petersfield. M.A., Camb., 1854. Helped Ardoino in his 'Flore des Alpes-Maritimes' (pref. p. xii). Bull. Soc. Bot. Fr. xxx. p. cxx. *Asplenium fontanum*, Phyt. iv. 814.

Helms, Richard (d. 1892–3): b. N. Zealand; d. Greymouth, N. Zealand, 1892–3. Had private museum. Herbarium purchased by J. C. Melvill. Botanist to Elder Expedition, W. Australia, 1891–2. Mosses in Univ. Herbarium, Oxford. Journ. Bot. 1894, 78, 82. *Helmsia* H. Boswell.

Henderson, Frederick (1841?–95): d. 24 Sept. 1895. Lieut.-Colonel, 107th Foot, 1880. F.L.S., 1875. Collected ferns in Nilghiris and at Simla. Had a herbarium. Ferns of Northern India (with C. B. Clarke) in Trans. Linn. Soc. 2nd S. (Bot.), i. 425. Proc. Linn. Soc. 1895–6, 37. *Polypodium Hendersoni* W. S. Atkinson.

Hick, Thomas (1840–96): b. Leeds, Yorksh., 5 May, 1840; d. Bradford, Yorksh., 31 July, 1896; bur. Undercliffe Cemetery, Bradford. A.L.S., 1894. B.A., B.Sc., Lond. Assistant-Lecturer in Bot., Owens Coll., Manchester, 1885. 'Protoplasmic continuity in Algæ,' Journ. Bot. 1884–85. Collection of fossil pl. in Manchester Museum. R.S.C. x. 223; Journ. Bot. 1896, 488; 1897, 193, with portr.

Higgins, Rev. Henry Hugh (1814–93): b. Turvey Abbey, Beds, 28 Jan. 1814; d. Liverpool, 2 July, 1893. B.A., Camb., 1836, M.A., 1839, Geologist. Chaplain, Rainhill Asylum, Liverpool, 1853–86. 'Fossil Ferns in Ravenhead Colliery' (with F. P. Marrat), 1872. R.S.C. iii. 348; vii. 978; x. 226; Jacks. 182; Journ. Bot. 1893, 286; Geol. Mag. 1893, 381.

(To be continued.)

NOTICES OF BOOKS.

Recent Literature on Freshwater Algæ.

The January part of *Flora* for this year contains the eighth of a series of papers published at intervals by Prof. Goebel, entitled "Morphologische und biologische Bemerkungen." This paper, which has for its subject "Eine Süsswasserfloridee aus Ost-Afrika," is a sequel to the sixth of the series, "Ueber einige Süsswasserflorideen aus Britisch-Guyana" (*Flora*, Heft iii. Schluss, Juni, 1897). In the earlier paper Prof. Goebel deals with previous literature on the subject, and raises biological questions on this group of algæ—a group which is specially interesting from a geographical point of view.

The genera of *Florideæ* hitherto known to be represented both in marine and fresh waters are *Bostrychia*, *Lomentaria*, *Chantransia*, *Delesseria ?*, and *Caloglossa*, besides two very doubtful species of *Ballia*. A freshwater alga is described by Askenasy and Schmidle from a mountain stream in New Guinea under the name of *Dasya Lauterbachi* (*Flora*, Heft ii. Feb. 1897), but this plant, according to Prof. Goebel (*Flora*, Heft iii. 1897, *l. c.*), belongs to *Bostrychia*, and is nearly allied to *B. Moritziana*. The genus *Dasya* can therefore no longer be regarded as having a representative in fresh water. The only freshwater species of *Delesseria* hitherto recognized is *D. amboinensis* Karsten (Bot. Zeit. 1891, p. 265), of which the fruit has not yet been seen. The whole structure of the thallus points, however, to its inclusion in *Caloglossa* rather than in *Delesseria*.

Prof. Goebel now describes a second species of *Delesseria* from a plant found by him among undetermined mosses in the Hamburg Museum. The "moss" in question was collected by Stuhlmann in Kibaoni stream, north from Kokotoni, Zanzibar, and examination proved it to be no moss, but a freshwater species of *Florideæ*. Prof. Goebel draws a comparison between this alga and *Delesseria amboinensis* Karst., to which it bears a close resemblance, but shows that sufficient points of difference exist to distinguish them as separate species. He therefore calls the African form ("for short") *D. zanzibariensis.* Authentic specimens of both these plants are in the British Museum Herbarium, and though it is plain that *D. amboinensis* and *D. zanzibariensis* are two distinct species, the difference between *D. zanzibariensis* and *Caloglossa Leprieurii* is not so obvious.

The British Museum has a large series of specimens of the latter plant from many parts of the world: the North and South Atlantic (New York, New Jersey, Florida, Guadeloupe, Cayenne), Cape of Good Hope, Australia, Tasmania, New Zealand, and the Indian Ocean (Mauritius, freshwater and marine, Ceylon, and Calcutta), these including, of course, both marine and freshwater records. The Ceylon specimens are described by Prof. Cramer in his exhaustive paper on *C. Leprieurii* (S. A. aus der Festschrift z. Feier d. 50-jährig. Doctorjub. von Nägeli u. Kölliker, Zürich, 1891). Comparison between these Indian Ocean specimens and *D. zanzibariensis* point very strongly to the fact of their being one and the same species. The position of the tetraspores in the two plants might at first sight seem to argue a possible specific difference, since in *C. Leprieurii* they grow in lines radiating outwards and upwards from the midrib, the number of sporangia in such lines varying with the width of the plant; while in *D. zanzibariensis* they are described as occurring in one or two rows along the midrib. But the thallus of *D. zanzibariensis* is as a rule narrower than the usual form of *C. Leprieurii*, and the space between the midrib and the edge of the thallus is too limited to allow the growth of more than one or two rows of sporangia.

C. Leprieurii is shown by Prof. Cramer (*l. c.*) to be a very variable plant in respect of size and breadth of the thallus, and it would be difficult, perhaps impossible, to show in what way *D. zanzibariensis* can be considered specifically distinct from *C. Leprieurii.* It is clear therefore that Prof. Goebel ought to reconsider the propriety of maintaining his "new species."

If it be granted that these two plants belong to the same species, the question of geographical distribution put forward by Prof. Goebel is more easily solved than is otherwise possible. He asks with solemnity what has become of the common marine ancestor of *D. zanzibariensis* and *D. amboinensis*, both found on islands separated by the whole width of the Indian Ocean? Is this ancestor still living, or has it died out, leaving only freshwater descendants? Now, allowing *D. zanzibariensis* to be but a form of *Caloglossa Leprieurii*, the answer is obvious. *Caloglossa* occurs throughout the Indian Ocean as a marine and brackish water plant; in Mauritius, indeed, it grows inland in a mountain stream. What more likely than that a form of this variable plant has become modified to its surroundings in Amboyna, and is regarded as the *Delesseria amboinensis* of Karsten?

The finding of the fruit of *D. amboinensis* will help to determine its true position, but in any case there is a near relationship between it and *C. Leprieurii;* and if, as is suggested by Mr. Karsten, the Amboyna alga, once marine, has accommodated itself to changed conditions consequent on a gradual raising of its habitat above the surface of the sea, the presence of *C. Leprieurii* at no great distance from the Malay Archipelago points rather significantly to the ancestor of *D. amboinensis*.

Prof. Goebel remarks that the occurrence of tetraspores in *D. zanzibariensis* is the only known instance among freshwater *Florideæ*. In the British Museum, however, there are tetraspores on the specimen of *C. Leprieurii* from the mountain stream of Ponce, Mauritius, mentioned above. If, therefore, *D. zanzibariensis* and *C. Leprieurii* were to be regarded as distinct species, this statement could not pass unchallenged; and if the two plants are allowed to be identical, there still remains *Bostrychia* (*Dasya*) *Lauterbachi* to be considered, the stichidia of which are described and figured by the authors in their original diagnosis of the plant (*l. c.*).

The same part of *Flora* (Jan. 1898) contains a paper by Dr. Oltmanns on the "Development of the Reproductive Organs in *Coleochæte pulvinata*." He makes some additions to the results published by Dr. Pringsheim (Beitr. z. Morph. u. System. d. Algen, iii. Pringsh. Jahrb. Bd. ii. 1860), but comes to the conclusion that on the whole *Coleochæte* is a "quite ordinary" (ganz gewöhnliche) plant, and unworthy of holding the important position of connecting-link between any great groups in the plant world. He adds that Nägeli had, however, come by another road to the same conclusion. It is disappointing to find no observations on the number of the chromosomes in the two generations, a point on which botanists have been waiting for some time for information.

A paper entitled "Observations on the *Conjugatæ*," by Messrs. W. and G. S. West, is published in the *Annals of Botany* for March, 1898. The authors embody in this paper the results of their investigations, "founded on a prolonged study of freshwater algæ from all parts of the world." They divide the *Conjugatæ* into three families—*Zygnemaceæ*, which includes *Mesocarpaceæ*, *Temnogametaceæ*, and *Desmidiaceæ*, and each family and subfamily is treated of in turn. Interesting facts are given with regard to the extremes of heat and cold at which these algæ can live, and specimens of *Closterium Leibleinii* are quoted, which were in "perfectly healthy and normally active condition" after having been frozen in the ice at Frizinghall, West Yorkshire, for over fourteen days. This instance is not exceptional, for the authors record species of *Spirogyra*, *Mougeotia*, &c., which have survived in temperatures below freezing-point. These conclusions are the more interesting, as being contrary to those published by Mr. Ewart "On Assimilatory Inhibition in Plants" (Journ. Linn. Soc. vol. xxxi. 1896, p. 395), where he says, speaking of freshwater algæ, "These plants are not very resistant to cold, all those examined being killed by being frozen."

It is also shown that direct sunlight "under natural conditions" is not only fatal, but tends to the formation of zygospores in *Conjugatæ*, though, as Mr. Ewart shows (*l. c.* pp. 439, 440), experiments under artificial conditions give a different result.

In conclusion the Messrs. West give a phylogenetic table of the

Conjugatæ, showing that they regard the *Zygnemaceæ* (as represented by the *Mesocarpeæ* and *Pyxisporeæ*) as the most highly specialized families of the group, "the formation of the sporocarp being a faint indication of an alternation of generations." It may be suggested that the use of the terms "carpospores" and "sporocarps" for spores of *Mesocarpeæ* requires more justification than is given by the authors.

The *Botanical Gazette* (vol. xxv. Feb. 1898, no. 2) contains "Observations on some West American Thermal Algæ," by Miss Josephine E. Tilden. These observations are based on three collections made by the author in Yellowstone National Park, Salt Lake City and Banff, and on algæ found by Mr. W. H. Weed in Yellowstone Park; and by Prof. F. E. Lloyd in the region of the Cascade Mountains, Oregon.

Miss Tilden describes two new species and several new varieties and forms. *Microspora Weedii* Tild. was found by Mr. Weed in Yellowstone Park, the temperature of the water in which it was growing being 49° C. The plant is described as being nearly allied to *M. abbreviata* Lagerh., differing from it "in being entirely free from the ferruginous colour, in having a thin membrane, and in its habitat." The other new species is *Spirulina caldaria*, found by Miss Tilden in the Natural Sulphur Springs at Banff, Canada. There are three plates, one being a photograph of Solitary Spring, Upper Geyser Basin, Yellowstone Park—a weird-looking place. Here *Phormidium laminosum* is said to form "plumy strings," indeed, this species is said by Miss Tilden to be "by far the most widespread and abundant of any alga in the hot waters of the park." She adds that so far as she knows it is the only species, except *Spirulina major*, that is found in both calcareous and siliceous waters in this region.

An interesting account is given by Prof. Dr. G. Ritter Beck von Mannagetta, in the *Botanische Zeitschrift* (Jahrg. xlviii. no. 3, March, 1898), "Die Sporen von *Microchæte tenera* Thur. und deren Keimung." The plant was noticed by him in a culture-glass containing algæ from the meadows bordering the Danube near Vienna. Dr. Beck mistook it at first for a species of *Lyngbya* forming arthrospores, and paid it no further attention at the time: later, however, the doubtfulness of this determination caused him to examine the plant carefully, with the result that he eventually proved it to be *Microchæte tenera* Thur. He describes minutely the formation and subsequent germination of the spores, and figures the plant at all stages during the process. He is inclined to doubt if this species has been rightly placed in the genus *Microchæte*, since he has never seen in his plant the "almost whip-like, elongate, persistent, vegetative filaments," as seen in the marine species *M. grisea* Thur. Dr. Beck considers that it would more properly belong to Kirchner's genus *Coleospermum*.

The first fasciculus of a *Prodrome de la Flore Belge*, edited by E. de Wildeman and Th. Durand, which has lately appeared, contains, besides the records of *Mycetozoa*, the *Schizophyta*, *Flagellata*, *Diatomaceæ*, *Conjugatæ* (employing the name in the Westian sense) and part of the *Chlorophyceæ*. Two other fasciculi of the work are to follow shortly.

In *Botaniser Notiser* (Häftet i. Lund. 1898), a list is given by Herman G. Simmons of freshwater algæ which form the most important of a collection made by himself last summer in South Sweden. Some of these records are new to that region. In each case the locality of the plant is mentioned, and critical remarks follow each record. A few species of *Florideæ* are given: *Hildenbrandtia rivularis* J. Ag., known in Mid-Europe, Denmark, and the North of England, and *Batrachospermum Dillenii* Bory, recorded as growing plentifully with *Lemanea fluviatilis* Ag., and *Chantransia violacea* Kütz. Swedish specimens of *B. Dillenii* have been issued as Nos. 1351 and 1352 in Wittrock and Nordstedt's *Algæ aquæ dulcis exsiccatæ. Enteromorpha prolifera* J. Ag. and *E. intestinalis* Link. var. *fluviatilis* represent the *Chlorophyceæ*, and the rest of the list consists of *Cyanophyceæ*. *Schizothrix pulvinata* is recorded as new to Scandinavia, and this holds good also of the preceding species, *S. lacustris*, which Mr. Simmons found "in little ditches near the shore at Ringsjön by Råröd." Several common species of *Phormidium* and of *Oscillatoria* are included, already known from Sweden, and recorded in Gomont's *Monographie des Oscillariées*.

E. S. Barton.

Plant-Breeding. Being five Lectures upon the Amelioration of Domestic Plants. By L. H. Bailey. 8vo, pp. xii, 293, with 20 figures. Price 4s.—*Lessons with Plants.* Suggestions for seeing and interpreting some of the common forms of Vegetation. By L. H. Bailey. 8vo, pp. xxxi, 491, with 446 figures. 1898. Price 7s. 6d. New York: Macmillan & Co.

Under a somewhat modest title Prof. Bailey has given teachers and students of botany an eminently suggestive and useful little book on plant-variation. It is not a dry list of statistics embodying the result of experiments on a few economic plants, or a recapitulation of the results of other people's work, or in any way an exhaustive treatise, but a few bright chapters in which the writer first enunciates the principles of the origin of forms, varieties, and species, and then illustrates them by application to some well-known domestic plants. The militant evolutionist will find much to criticize, if he thinks it worth his while. The mysticism of Weissmann is dismissed in a couple of short pages.

Prof. Bailey is talking to students who are only beginning the study of biology, botany, or horticulture. His aim is to impress upon them the individuality of plants, and the reality of their variation, and to point out some of the causes regulating that variation, and how the knowledge thus gained may be turned to practical account; and we think he has succeeded. We are convinced that those who heard his lectures went away with certain very clear ideas on the possibilities embraced in the term "a plant," which would add interest and purpose to their further studies in its morphology, anatomy, and physiology. These are the titles of the lectures which now appear collected in book form:—I. The fact and philosophy of variation; II. The philosophy of the crossing of plants, considered in reference to their improvement under cultivation; III. How domestic varieties originate; IV. Borrowed opinions; V. Pollination; or how to cross plants.

The author begins by insisting on the fact of individuality—the attribute of every living object. No two plants in a row of lettuce are alike; that is to say, plants are infinitely variable. This being the case, it is not strange if now and then some departure, more marked than common, is named and becomes a garden variety. Nature knows nothing about species; her concern is with the individual, the ultimate unit. As to what is this unit, Prof. Bailey is happy in his comparison of animal and plant. Every higher animal is itself a unit; the plant has no distinct autonomy. "The ultimate unit or individual in growing plants is the bud and the bit of wood or tissue to which it is attached; for every bud, like every seed, produces an offspring which can be distinguished from every other offspring whatsoever." Four causes of individual differences are suggested. Fortuitous variation, the expression of the elasticity which is a part of the essential constitution of all living beings; sex, the existence of which is explained by "the need for a constant rejuvenation and modification of the offspring by uniting the features of two individuals into one"; changes in physical environment; and the struggle for existence, in which "plants have adapted themselves to other plants as truly as they have adapted themselves to soil or climate."

The lecture on plant-breeding comprises fifteen rules which are to be observed if the best results are desired. These rules are an application of the principles laid down and discussed in the previous chapters. Prof. Bailey has a great advantage in being able to illustrate so many of his statements with the results of his own experiments. Those on crossing are especially extensive, and his concluding chapter on the technique of pollination is a useful addition. That it is a subject demanding some patience and perseverance is evident from the author's remarks on "Uncertainties of Pollination," and the racy account of his own attempt, and failure, to improve the pumpkin with the common little pear-shaped gourd.

After reading his book on *Plant-Breeding* we expect something original from Prof. Bailey, even if it is only a text-book for beginners; and, fortunately, its very moderate price should ensure as extensive a use of his *Lessons with Plants* as we could wish. The book is indeed a very cheap one, for it simply overflows with bold useful drawings made expressly for it by Mr. W. S. Holdsworth, while the print is as large and clear as in a child's reading-book, and the general get-up is worthy of Messrs. Macmillan. The title aptly expresses the nature of the contents. They are just the kind of Lessons that an ideal teacher would evolve for himself from the plants. But there are so few ideal teachers, and a large majority will welcome Prof. Bailey as a guide, and having first worked out the Lessons for themselves, will find little difficulty in expanding and extending them. And if it should happen that certain specimens are not to be procured or substitutes to be found, the pictures will form a very good last resort. But we hope that they will only be used apart from the specimens as a last resort.

Children, before they go to school, have an innate love of natural history. It is all so wonderful. Why do the marguerites disappear and the poppies blaze out in their place, only to be supplanted by something else? Where do they come from? Why do they come? And how many parents trouble to satisfy the little minds? When they go to school they learn other things, or at best pick to pieces one flower a week and tag the fragments with hard names, and think botany only a trifle less dry than arithmetic or geography. How different this sounds:—"Let the pupil lie under a dense shade-tree on a summer's day and look up into the dark top. . . . The outside presents a wall of foliage, often so well thatched as to shed the rain like a roof, but the inside is comparatively bare. . . . The lower leaves have stretched out their stalks in eagerness for the sunlight." The application follows so naturally that the lesson is learnt unconsciously.

One of the most obvious facts in nature is the great difference in the growth-form of the various kinds of trees and shrubs. Prof. Bailey begins with a lesson on twigs and buds, in which the reason of the differences gradually appears. In the next chapter, or "part," leaves and foliage are studied; then flowers, fruits, propagation of plants; then behaviour and habits; and, finally, the kinds of plants, including their preservation, and hints on the way to form a herbarium. The book concludes with a useful appendix entitled "Suggestions and Reviews," in which the teacher will find many useful hints, among others, for the arrangement of the school-house and garden.

As necessarily happens with books intended for use in the eastern United States, some of the plants mentioned are unfamiliar to the English teacher. But there should be no difficulty in finding substitutes, for, as we have already hinted, it is in its method that the great value of the book lies, and any teacher who is worthy the name should be able to adapt it to the surroundings among which he has to teach, and from which he must draw the material which is to be the direct means of imparting the lesson.

A. B. R.

Life and Letters of Alexander Goodman More, F.R.S.E., F.L.S., M.R.I.A.; with Selections from his Zoological and Botanical Writings. Edited by C. B. MOFFAT, B.A.; with a preface by FRANCES M. MORE. Dublin: Hodges, Figgis & Co. (Ltd.), 104, Grafton Street. 8vo, pp. vii, 642. 1898.

IT is rather remarkable how few lives of eminent botanists have been written. Of Professor Babington we possess the volume of letters and records recently reviewed in this Journal; but of a long line of his contemporaries and predecessors, little is known beyond their published work. Of the lives of Robert Brown and his successor in the British Museum J. J. Bennett, of George Bentham, J. H. Balfour, Wm. Borrer, J. T. I. Boswell (not to go further into the alphabet), we have few or no memorials; and this lack seems the more remarkable in these days when truly "of making many books there is no end."

To those who knew him, these memorials of Alexander Goodman More will forcibly recall the genial friend whose intense enthusiasm and lively wit were ever tempered by a gentleness which attracted the affectionate regard of all who were brought into personal intercourse with him. A naturalist of the highest order, and with the keenest sense of what genuine and good work in the several branches of science was, he never despised the humblest worker, but was always ready to give cheering yet wise encouragement and counsel. Many probably knew him only from his letters; and, as this volume will show, his letters reveal the same character, abounding as they do in kindly satire and criticism, as well as in full appreciation of true observation and research.

The writer has recently reperused some of the numerous letters which in the halcyon days of long ago, 1867–1887, he received from Mr. More, and he was astonished to recognize how very much he owed to the stimulus of these letters, full of most sound advice and useful suggestion. Doubtless, to very many in the wide circle of zoologists and botanists who knew him, Mr. More has been a mentor, both enthusiastic and discreet, stirring students to energetic effort, whilst ever inculcating caution and patience.

To all lovers of nature this volume will be welcome, containing, as it does, in its fifty-four chapters (pp. 1–398), admirable selections from his correspondence and diaries; and in the appendices (pp. 399–623) some valuable papers and notes, which are not easily obtainable in their original issue. The whole book reveals a diligent and painstaking worker in many lines of scientific observation and research, who, excellent as he was in the field, was no less so in the study, and whose education and training—though seriously interfered with by a delicate constitution, and by long and frequent periods of ill-health—had fitted him to make the fullest use, for scientific purposes, of the opportunities which as as a botanist and zoologist his life afforded him.

It is refreshing in these days of rather over-devotion to athleticism to read in this volume of the Rugby boy who, whilst "he took to public school-life with gusto" and "was a keen athlete as well as a quick scholar," yet had the observant eye and enquiring mind which even in his nursery had gained for More the sobriquet of "Master Why-why." Whether he ever filled his Rugby study with stinks, as did "Martin" in the days of "Tom Brown," is uncertain, but "Natural History had now become his recognized hobby"; and before he left school he had laid the foundation of both his scientific knowledge and his scientific library, and had contributed his first note to a scientific periodical, *The Zoologist*, a note which, though it recorded a mistaken identification of a rare bird, yet shows an acquaintance with birds and a close observation of the character of species unusual in one so young.

Beginning, as so many have done, with collecting insects and birds, his best known work was, perhaps, done in botany; but he maintained a firm grasp of a wide range of subjects, ornithology being, next to botany, his chief delight.

Ireland and the Isle of Wight were the two districts in which his life was mostly spent—the Isle of Wight in his earlier and Ireland in his later years. Though settled in Ireland, as events proved, for life, he at one time looked forward to revisiting the Isle of Wight; and speaks in one of his letters to the writer of a "pocket-flora of the island, which I still hope that you and I may undertake *some day* when I return to spend my *declining* years in the old hunting-grounds." But, alas, this was not to be. His health, never very strong, had suffered considerably from an experience of which it is strange indeed to read as occurring to a naturalist in the nineteenth century in the British Isles. Visiting, in July, 1873, during a dredging expedition, in company with Mr. (now Sir John) Dillon, Inishkea, an island about eight miles north of Achill, on the west of Ireland, More was mistaken by the islanders for the author of a letter which had lately appeared in print with reference to the supposed idolatrous worship by the islanders of an image, probably the figure-head of a ship, for which they appear to have had great regard as an ancient relic, and which was called the "Neve-ogue." The islanders were "fiercely indignant at the language which (they were assured) had been applied to them by the writer of the letter," and knowing that the visitors had come from Achill, and that Mr. More had visited the island the previous year, they erroneously inferred that the letter had been written by him. Taking the opportunity of More's being separated from his friend, a group of the islanders surrounded him, and before he could gather the meaning of their anger "a blow from a heavy piece of timber had stretched him, stunned, on the ground. . . . Frequently in later life Mr. More avowed the belief that he owed the preservation of his life at this juncture in no small degree to the promptitude and resolution of his friend Sir John Dillon, who, as he returned through the village, saw the people hastening to the shore, and was horrified to find his companion lying on the ground. Further molestation was plainly promised, for a crowd gathered near the harbour; and when Mr. More, with his friend's assistance, was able to walk towards the boat a shower of stones assailed them. Verbal remonstrance was useless; and Mr. Dillon raised his breech-loader, warned the people that he meant to protect his comrade, and shot two sea-gulls by way of illustration. The effect of the poor birds' fate was instantaneous. The islanders, who had never seen a breech-loader before, were filled with amazement, and needed no further warning." An incident, this, which (in character) we might have expected to find in Darwin's *Voyage of the Beagle*, but hardly in the account of a visit to any part of Great Britain.

This unfortunate affair was followed by exposure in the boat during the whole night to a gale of wind and pouring rain; and though he was unwilling to concede that he felt the worse for the adventure, a serious illness overtook him during the autumn; and it seems that from that time "his intervals of ill-health were much more frequent than before, and he was never again equal to the same degree of sustained activity as in former summers." And indeed he seems to have sustained permanent injury, as we find it stated that, in 1879, "The injuries received six years ago at Inishkea were telling upon him, and constant pain in the hip-joint, sometimes amounting to acute agony, threatened to render him permanently helpless. On the 17th September [1879] he underwent an operation"; and it was not until the 25th of February, 1880, that a note in his journal records, "leg-wound closed and healed."

In both the Isle of Wight and in Ireland, More's work was of a permanent character. In the former district he succeeded, as a resident botanist, Dr. Bromfield, who died whilst travelling in Syria in October, 1851; and More much regretted that a projected meeting of the two botanists, before Dr. Bromfield left England, had unfortunately been prevented. Some of Dr. Bromfield's botanical apparatus came into Mr. More's hands, and by him was given to the writer when Mr. More finally settled in Ireland. He also set in order and considerably added to the herbarium of Dr. Bromfield's plants, which was, and still is, in the custody of the Philosophical Society at Ryde.

The articles on the Zoology and Botany of the Isle of Wight, published in 1860 in Venables' Guide to the Island, and the *Supplement to the Flora Vectensis*, published in this Journal in 1871, are still the latest collected records published as regards the Isle of Wight as a separate district; though Mr. Townsend's Flora of Hants contains these and later records.

As regards Ireland, his great work is the *Cybele Hibernica*, which Dr. Moore and he published in 1866, and of which Dr. Moore wrote that Mr. More "took even more than his full share in that work." This *Cybele* was carried out upon similar lines to those laid down by Mr. Hewett Cottrell Watson for his *Cybele Britannica;* and was followed by a supplement, published in 1872. The new edition of the *Cybele*, at which he had been working since 1882, he did not live to complete.

The *Life and Letters*, for which we are indebted to his sister Miss Frances M. More, has been very ably edited by Mr. C. B. Moffat, B.A., and forms a handsome volume, well printed, and appropriately bound in green. The likeness of Mr. More, though by no means a flattering one, will yet vividly recall his personal appearance to all who knew him.

FREDERIC STRATTON.

Contributions à la connaissance de la flore du nord-ouest de l'Afrique et plus spécialement de la Tunisie. I. Ranunculaceæ—Cucurbitaceæ. Par Sv. MURBECK. Lund: 4to, pp. vi, 126; tt. vi. [Acta Reg. Soc. Physiogr. Lund. viii.] 1897.

As holder of the bursary on the Letterstedt foundation, the author in 1896 made an expedition to Algeria and Tunis for the purposes of collecting seaweeds and of studying the physiognomy of the phanerogamic vegetation of the highlands and of the Sahara desert. The heavy and long-continued rains of the previous winter in Algeria made the season very unfavourable for his investigation there on the land plants, and induced him soon to proceed to Tunis, where, favoured with the assistance of the French authorities, he was enabled advantageously to carry out his scientific work. Before returning home he spent some time at the Museum of Natural History in Paris, where he availed himself of the opportunity there offered to determine as precisely as possible the geographical distribution of the new or imperfectly known forms of the plants included in his treatise; an exact knowledge of this distribution, especially in the polymorphous groups of plants, he considers to be one of the essential conditions for properly estimating the affinities and phytogenetic developments of the types.

In the hope that the *Compendium Floræ Atlanticæ* begun by Cosson will be continued, Dr. Murbeck omits in general any description of new species and forms contained in the museum, other than those met with in his journey or such as are related more or less closely to his own collections. If sometimes his determinations must be regarded as more or less approximate, he says that such is a necessary consequence of the richness of the natural materials embraced in the polymorphous groups which as yet are but imperfectly understood.

A conspicuous feature of this contribution consists in the numerical statistics in metres, expressing the vertical range of the Tunis plants of the collection; many of the species and varieties are recorded as extending up to 1300 or 1350 metres; one, *Holosteum umbellatum* L., a species new to the Tunis flora, to 1375; and another, *Alsine Munbyi* Boiss., also new to this flora, occurs from 800 to 1400 metres of elevation. The treatise is very carefully elaborated, and the literature of the subject accurately attended to. In the thirty-six natural orders included in this part, there are recorded 430 species and hybrids distributed amongst 177 genera; there is one new genus; and there are fourteen new species, besides ten new subspecies. The sequence of orders is nearly that of Bentham and Hooker; but *Cucurbitaceæ* is placed after *Campanulaceæ*. *Carophyllaceæ* is split up into *Silenaceæ* and *Alsinaceæ* and counts as two orders, and *Paronychiaceæ* is placed next; similarly the *Rosaceæ* in the larger sense is divided into *Amygdalaceæ*, *Rosaceæ* in a smaller sense, and *Pomaceæ*, and counts as three orders; and *Fumariaceæ*, in accordance with a prevalent view, is kept distinct from *Papaveraceæ*. A new grammatical rendering is taken in treating *Polygala* as neuter in gender, contrary to Pliny and subsequent authors. If it is desirable to give effect to the gender of the Greek derivation of the principal part of the word, it would have been better to have followed the style of Dioscorides and to have written the name in the form *Polygalon*. The *Polygala* of Pliny probably belongs to a different genus from that of the herbs now comprehended under this name; but this consideration need not affect the question of gender.

The plates contain eighty small figures from drawings drawn by the author, and representing the flowers or other parts or dissections of plants, and illustrate thirty-one species. The new genus is

Pseudorlaya in *Umbelliferæ*, and is allied to *Orlaya* and *Daucus*, being diagnosed from them as follows:—

Orlaya: prickles of the secondary ridges of the fruit hooked at the apex.

Pseudorlaya: prickles of the secondary ridges in two or three rows, straight at the apex.

Daucus: prickles of the secondary ridges in one row, straight at the apex.

The naming of the species of the new genus, recorded on p. 86, is not without interest; the name and synonymy as quoted, with dates, are:—

PSEUDORLAYA MARITIMA.

Daucus muricatus, *β. maritimus* L. (1753).
Caucalis pumila Gouan (1765).
C. maritima Gouan (1767).
D. maritimus Gaertn. (1788), non Lam. (1789).
Orlaya maritima Koch (1824).
D. pumilus Ball (1878).

The selection by the author of the specific name *maritima* is quite apt and need not be complained of, although it is clearly a violation of the rule, with which unfortunately many botanists attempt to fetter nomenclature, compelling the adoption of the oldest specific name in all cases, regardless of propriety; indeed our author, in a note on p. 25, concedes and insists on this principle, and there coins a new name for a species which had already been adequately named in the right genus, in order to include the oldest trivial name. In the case of the *Pseudorlaya* it appears that *muricata* is the oldest trivial name. If it is to be contended that, as Linnæus had confused two different plants under this name, the typical one not being the plant under consideration, *muricata* cannot be accepted in this case, then the oldest possible trivial name would be *pumila;* in no case, however, can *maritima* claim to accord strictly with the rule, the force of which Murbeck fully admits in principle. Yet the name employed by him is so good and obviously the best one for his purpose, that the departure from the principle appears not even to have occurred to his mind. It is to be hoped there was no intention to extend this objectionable and disturbing rule, so as to compel the adoption of a mere varietal name, even when originally applied to a totally wrong species and in a wrong genus.

W. P. H.

Les Végétaux et les Milieux cosmiques (*Adaptation—Evolution*). Par J. COSTANTIN. 8vo, pp. 292, figs. 171. Paris: Baillière. 1898. Price 6 fr.

THIS volume is the eighty-eighth of the French International Scientific Library, of which M. Ém. Aiglave is editor. It is a good example of the kind of book such a series should contain, in that it gives a readable account of one aspect of a science without attempting too much, or pretending to be a text-book. It is the kind of book which tends to popularize without degrading science. Many of the points raised admit of far wider discussion, and theories are suggested which are open to criticism; but theories after all are only temporary conveniences for arranging and correlating facts, and within limits we may sacrifice much to convenience. We would suggest, however, that the beginning of a book is a more convenient place for a table of contents than the end, and that to publish a work of this kind without an index should be made a criminal offence. The general get-up of the work is useful rather than artistic. The cover is strong but not beautiful, the quality of the paper is moderate, but the type is clear, and the figures, though poor, help to elucidate the author's meaning. The cover and title-page are punched like a tram-car ticket, but this may be only to render the review copy unsaleable.

The book comprises an introduction and four parts. The introduction is short, and deals almost entirely with Goethe's view on the variation of plants. The four parts are more interesting; they include twenty-three chapters, and contain a very fair account of the influence of heat, light, gravity, and an aquatic medium as factors of environment in plant-life. For instance, the first part opens with a brief account of the distribution of heat on the surface of the globe, and a contrast of arctic and tropical floras, followed by an attempt to explain the difference. It is shown by examples how the duration of life of a plant varies in different climates, why annuals are unsuited to the brief vegetative season of an arctic zone, how a damp tropical climate may favour a woody habit as a result of an uninterrupted growth-season, and so on. The relation between light and colour in the zonal distribution of seaweeds is explained in the part devoted to light, and chapters are given to its influence on movement and growth, and on the position, form, and structure of plant organs. The characteristics of marsh-plants, amphibious, swimming, and submerged plants are headings for the fourth part, which ends with an unnecessary chapter on the notions of variation of living organisms among the ancients, in which, among other things, the figure of Venus is evolved from a cuttle-fish. The book as a whole will give an intelligent person with a very slight knowledge of botany a very fair idea of plant physiology.

A. B. R.

Anatomia vegetale. Del FILIPPO TOGNINI. Small 8vo, pp. xv, 274, figs. 141. Price lire 3.—*Fisiologia vegetale.* Del LUIGI MONTEMARTINI. Small 8vo, pp. xv, 230. Price lire 1.50. Milan: Hoepli. 1898.

THESE handy little books form numbers 246–247 and 265 respectively of the Manuali Hoepli, an Italian Scientific Series. The matter is well arranged, and seems very fairly up-to-date, and the text is clear. The most striking feature is, however, the great wealth of illustrations; the figures, which are far above the average for the style of book, have been freely borrowed from Sachs, De Bary, and other well-known text-books. Others are less familiar, and several are new. An additional advantage from the student's point of view is the small size of the volumes, which renders them eminently suitable for surreptitious use in the examination-room.

A. B. R.

BOOK-NOTES, NEWS, &c.

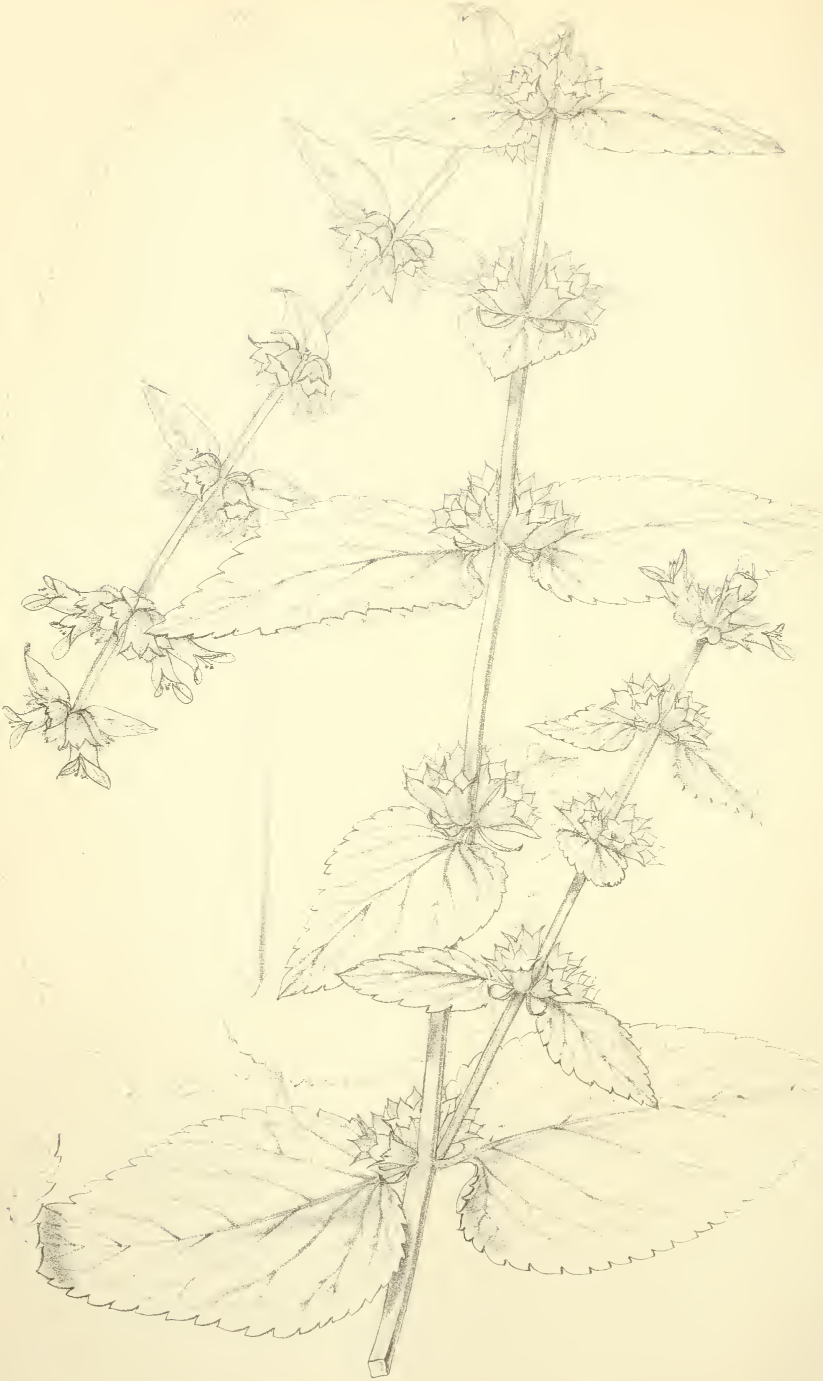
The executors of the late Baron von Mueller invite subscriptions (which should be addressed to the Rev. W. Potter, Arnold Street, South Yarra, Melbourne) towards the cost of erecting a monument on his grave. The supplementary volume of the *Flora Australiensis*, which the Baron was preparing for the press at the time of his death, will shortly be published, as well as an account, in two volumes, of his administration as Director of the Botanic Gardens, which will include a biography and complete bibliography.

In *The Chemistry of the Garden*, by Mr. H. H. Cousins (Macmillan: 1s.), the author has rendered a useful service by stating plainly, concisely, and clearly how plants are to be fed if they are to thrive. There is no more important subject for practical gardeners than that of manuring, and yet unfortunately comparatively few understand it. The gardener must not look upon the soil as a dead mass of dirt, but rather as a kind of cupboard, containing all kinds of food for plants; and as this is emptied of this food by the absorption of the rootlets, means must be found for replenishing it. An intelligent system of manuring does this. Science and practical experience prove that very few foods are essential for the welfare of plants in general, although some of course prefer a larger quantity of one food than another. By keeping the soil well stocked with nitrates, phosphates, and potash —according to the nature of the crops—the gardener or farmer does all that is necessary; and he is told how to do this in Mr. Cousins's little work.

At the meeting of the Linnean Society on March 17th, Mr. Clement Reid, F.L.S., read a paper on *Limnocarpus*, a new genus of fossil plants from the tertiary deposits of Hampshire. This new genus occurs in the oligocene strata of the Isle of Wight and the Hampshire coast. It is closely allied to *Potamogeton* and to *Ruppia*, but has a succulent fruit with two deeply-pitted stalked carpels adhering by their ventral edges. The seed is curved round a lateral process from the cell, as in the pondweeds. So few tertiary plants can be proved to belong to extinct generic types, that the discovery of this one is of interest. Though clearly allied to the recent pondweeds, the inclusion of *Limnocarpus* will necessitate a modification of the ordinal characters.

Dr. Frank Rand, whose "wayfaring notes" we published in our last issue, has again left England for Rhodesia, where he hopes to make further collections for the National Herbarium.

The Rev. Charles William Perry, M.A., died at Wokingham on March 30, at the age of sixty. Mr. Perry had been for over thirty years bursar and assistant-master at Wellington College, and had for many years taken an interest in the plants of the neighbourhood; lists by him were published in the Reports of the Wellington College Natural History Society for 1869–74, and a useful summary of his botanical work is given by Mr. Druce in his *Flora of Berkshire* (p. clxxx).



R.Morgan del et lith. West, Newman imp.

Stachys alpina L.

STACHYS ALPINA IN BRITAIN.

(Plate 384.)

The accompanying figure of this interesting addition to our Flora, which was announced with full particulars as to locality, etc., in this Journal for 1897 (p. 380), is from specimens sent to the National Herbarium by its discoverer, Mr. Cedric Bucknall. We append the description of the plant given by Grenier & Godron (Fl. de France, ii. 689), who place it with *S. germanica* L. and *S. heraclea* L. in the section *Eriostachys*, which is characterized by "bractéoles aussi longues ou presque aussi longues que le calice; tiges herbacées."

"S. alpina *L. sp.* 812; *Vill. Dauph. 2, p.* 378; *DC. fl. fr. 3, p.* 548; *Lois.! gall. 2, p.* 14; *Godr. fl. lorr. 2, p.* 201; *Koch, syn.* 652.—*Ic. Lapeyr. fl. pyr. tab.* 8; *Rchb. exsicc. no.* 1448!; *Billot, exsicc. no.* 613!—Fleurs presque sessiles, au nombre de 5 à 10 à l'aisselle de chaque feuille florale, formant un épi terminal très interrompu; bractéoles linéares-subulées, atténuées à la base, réfléchies, plus ou moins velues. Calice muni de longs poils et en outre de poils plus courts et glanduleux, campanulé à dents *un peu inégales* étalées, ovales, acuminées-mucronées. Corolle purpurine, tachée de blanc, laineuse extérieurement, plus longue que le calice; tube muni intérieurement d'un *anneau de poils oblique;* lèvre supérieure porrigée, obovée, obtuse entière, barbue au sommet; lèvre inférieure *plus longue que la supérieure* à lobe médian le plus grand, émarginé. Akènes gros, bruns, lisses. Feuilles vertes en dessus, plus pâles en dessous, *velues sur les deux faces* fortement crénelées; les inférieures longuement pétiolées, *ovales-en-cœur;* les supérieures sessiles, lancéolées, acuminées. Tige dressée, velue, un peu glanduleuse au sommet, simple ou un peu rameuse.—Plante de 3–6 décimètres."

Nyman gives the distribution of the species as: "Hisp. bor., centr., or. Gall. Belg. Germ. occ. Bavar. Helv. Ital. bor., med. (et Lucan. ?). Austr. Hung. Slavon. Trans. Croat. Monten. Herceg. Bosn. Serb. Maced. mont." From this it will be seen that, in spite of its specific name, there is nothing intrinsically improbable in the occurrence of *Stachys alpina* as a native British plant; and Mr. Bucknall's description of the Gloucestershire locality tends to establish its nativity. As the plant had so long escaped notice in a well-worked district, it seems possible that it may have been similarly overlooked elsewhere, and that the present summer may extend our knowledge of its occurrence in Britain.

NEW MALAYAN ORCHIDS.

By Henry N. Ridley, M.A., F.L.S.

The following new species of Orchids have been obtained since the publication of my paper on the Orchids of the Malay Peninsula in the *Journal of the Linnean Society*, xxxii. 213–415 (1896), I add a few further notes on already described species, as well as a few novelties of the Malay Archipelago.

Oberonia aurantiaca, sp. n. Acaulis, folia pauca (ad 6) falcata acuminata carnosa atroviridia, 2 pollices longa, ⅛ pollicis lata vel minora. Spica 4 pollices longa, nutans, basi bracteis lanceolatis acuminatis tecta. Bracteæ virides anguste lineares acuminatæ. Flores minimi verticillati. Sepala ovata aurantiaca patentia. Petala oblonga obtusa apicibus denticulatis multo angustiora. Labellum angustum oblongum rufum, lobis lateralibus mediocribus oblongis obtusis quam lobus medius multo brevioribus, lobo medio anguste oblongo apice bifido. Columna pro genere alta rufa, stelidiis nullis. Anthera alba.

Selangor, Kajang. Coll. *J. Goodenough*, 1897.

A curious little species allied to *O. rufilabris* Lindl., a Burmese plant, from which the short lateral lobes of the lip and the spreading terminal lobes with no intermediate one distinguish it. It is also a more fleshy and stouter plant.

Liparis (§ Mollifoliæ) **pectinifera**, sp. n. Terrestris, pseudobulbis vetustis cylindricis, 4½ pollicis longis, ½ pollicis crassis, purpureis. Folia majora tenuia inæqualia 5, undulata læte viridia, inferiora ovata, superiora lanceolata vel ovato-lanceolata acuta, nervis validis elevatis, 6 pollices longa, 3 pollices lata vel minora. Scapus validus tricarinatus basi nudo. Flores mediocres dissiti. Bracteæ ovatæ acutæ undulatæ superiores lanceatæ, ⅛ pollicis longæ. Pedicelli cum ovariis ½ pollicis longi, graciles. Sepala linearia obtusa voluta, læte viridia, ⅜ pollicis longa. Petala anguste linearia breviora. Labellum oblongum apice late quadrato bilobo dentato, linea mediana incrassato, callis nullis, viride lineis 2 in disco purpureis. Columna gracilis curva exalata viridis. Anthera ovata, polliniis aurantiacis.

Southern Perak, Dindings. In woods on the hill Gunong Tungul.

I found this plant growing in dense woods on the ground, and, bringing it home, flowered it in the botanic gardens. In habit it resembles *Microstylis congesta* Lindl., being a stout plant with large pseudo-bulbs and undulate leaves. The pectinate lip and complete absence of calli, represented merely by a thickening at the base of the lip, make it very distinct from any of our native species; but it is more closely to *L. pectinata* Ridl., a very little-known plant collected once in the Philippines by Cuming. That species is, however, much smaller, and has a pair of calli at the base of the lip.

DENDROBIUM SUPERBUM Rchb. fil. This has now been found by Mr. Stephens in Perak, and confirms my opinion that *D. Scortechinii* Hook. fil. is identical with *D. superbum*.

D. AUREUM var. PHILIPPINENSIS has also been sent me by Mr. Stephens from the Thaiping Hills, Perak. This well-known plant, which appears to be very rare in the peninsula, might well have been expected to occur, as it is found in India, Java, and the Philippines.

D. modestum, sp. n. Radices graciles copiosi. Caules pauci graciles, 7 pollices longi, ⅛ pollicis longi purpurei superne flexuosi nervis conspicuis albis. Folium singulum (rarius 2) subterminale lanceolato-lineare pollice longum, ¼ pollicis latum petiolatum. Flores bini pedunculo brevissimo, pedicellis ½ pollicis longis. Bracteæ minutæ. Sepala lanceolata, lateralia basibus latis, ⅜ pollicis longa subobtusa rosea, mento sepali æquali acuminato acuto. Petala linearia oblonga breviora alba. Labellum ovatum acuminatum sepalis brevius pubescens, album, striis in lateribus violaceis. Columna breviuscula, anthera oblonga elevata alba, punctis duobus violaceis. Stigma oblongo-scutiforme, violaceo-marginatum.

Penang Hill; March, 1896.

This elegant little plant I found growing on a bank among grass on the top of Penang Hill, a most unusual habitat for a *Dendrobium*. It is a slender-stemmed plant with but one or two narrow leaves on the top of the stem. The sepals are white, tinted with rose. The lip entire, ovate, the sides elevated and ornamented inside with violet stripes. The affinity of this plant is with *D. hercoglossum* Rchb. fil.

Bulbophyllum flammuliferum, sp. n. Rhizoma crassum longum ⅛ pollicis in diametro. Pseudobulbi distantes oblongo-lanceolati complanati sæpe curvi, 2 pollices longi, ½ pollicis lati, ⅛ pollicis crassi, olivacei. Folium oblongum lanceolatum coriaceum obtusum basi angustato, 8 pollices longum, pollice latum. Scapus prope basin pseudobulbi exortus sex pollices longus, basi vaginis tenuibus ventricosis viridibus tecto. Flores circiter 25, pro sectione magni. Bracteæ quam pedicelli longiores, ¼ pollicis longæ, lanceolatæ tenues pallide virides, pedicellis tenuibus. Sepala lanceolata acuminata flavescentia apicibus aurantiaco-coccinea. Petala minima oblonga obtusa flavescenti albida. Labellum breve carnosum linguiforme obtusum minute pustulatum flavescens apice coccineo. Columna brevis stelidiis bifidis lobo postico erecto lanceolato; antico breviore rotundato obtuso, per columnæ producta.

Selangor, in rupibus cacuminis Gua Batu, 1897; fl. Dec. & Jan.

This little plant is allied to *B. apodum* Hook. fil., but has much larger pseudo-bulbs and flowers than those of any of that section. In form and colouring the flowers resemble those of *B. capitatum* Lindl. and *B. concinnum* Hook. fil. in form and colour, but are very much larger. It grows on the limestone rocks at Gua Batu, near Kwala Lumpur, at an altitude of about 1000 ft.

B. MACRANTHUM Lindl. I found this on trees on the Mandau River, Siak, Sumatra.

Cirrhopetalum ochraceum, sp. n. Pseudobulbi conici 4-angulati, 1½ pollicis longi, ½ pollicis crassi. Folium subpetiolatum lanceolatum coriaceum obtusum basi carinato, pallide viride, 7 pollices longum, pollice latum. Scapus gracilis ruber, 10-pollicaris, vaginis 1–2 albescentibus. Flores 10, mediocres. Bracteæ lanceolatæ acuminatissimæ uninervio nervo rubro. Sepalum posticum ovatum acuminatum rubescens trinervium, margine capillis longis rubris munito, lateralia omnino connata oblongo-lanceolata obtusa ochracea dense rubro punctata. Petala lanceata rubra capillis rubris marginata. Labellum linguiforme olivaceum canaliculatum.

Selangor, on the Pahang track, on trees; Aug. 1897.

This species is allied to *C. Makoyanum* Rchb. fil., but is altogether a larger plant, with much broader lateral sepals. The sepals are connate throughout their entire length, and the apex of the connate pair is inæquilateral; they are 1 in. long and ¼ in. wide. The colouring of the flowers is rather dull, the upper sepal and petal reddish, the lateral connate pair an orange-ochre colour with numerous red dots.

C. Curtisii Hook. fil. (Bot. Mag. t. 5774) was collected by Mr. Curtis at Pungah, in Siam, not in Malacca, as suggested in the *Botanical Magazine*.

Eria cymbidifolia, sp. n. Caules compressi haud incrassati, undique foliati breves. Folia 5, rigida linearia recurva apicibus valde inæqualiter biloba læte virentia, 15 pollices longa, ½ pollicis lata. Racemus nutans ex axilla superioris, 6 pollices longus, basi nudo glabro. Flores dense congesti patentes, ½ pollicis lati albi, ferme glabri. Sepalum posticum ovatum oblongum, lateralia multo latiora obliqua subacuta. Petala breviora ovata acuta. Labellum breve saccatum ad basin cymbiforme, lobi laterales breves triangulares subacuti, epichilium ovatum acutum, carinis 2 latis in disco, e basi labelli ad basin epichilii. Columna recta pede puberulo purpurascente. Anthera lata rotundata rostrata. Pollinia 8, in fasciculis duobus. Stigma transversim ovale.

Borneo, at Pontianak (cult. in Hort. Bot. Singapore).

The most striking feature of this plant is the long narrow foliage rising from the base of the stem and recalling the leaves of *Cymbidium aloifolium*, and the absence of any pseudobulbous enlargement of the stem, which indeed is flattened. The flowers are numerous and crowded, borne on a raceme shorter than the leaves, and springing from one of the upper axils. The broad lateral sepals are separated to the base of the lip, spreading widely open. The lip is peculiar in having two broad bars running the whole length of the disc between the lateral wings, and covering a nectary formed by the boat-shaped floor of the lip, the only entrance to which is a space at the extreme base. The whole sac is full of nectar. A somewhat similar arrangement occurs in some *Sarcantheæ*, but I have seen nothing like it in any other *Eria*. The pollinia are arranged in two masses, each consisting of two unequal pairs of pollinia.

E. sumatrensis, sp. n. Pseudobulbi breves congesti crassi conici nodis circiter 5, 1½ pollicis longi, ¾ pollicis lati, vaginis purpureo-brunneis nervis albis elevatis tecti. Folia 3, lorata vel oblanceolata obtusa tenuiter coriacea carinata, et canaliculata, apicibus inæqualiter bilobis, 7 pollices longa, $\frac{3}{4}$ pollicis lata vel minora. Scapus brevis, $2\frac{1}{2}$ pollices longus, e nodo summo, teres tomento brunneo tectus. Flores parvi, circiter 12, laxe racemosi. Bracteæ lanceolatæ acuminatæ demum reflexæ, $\frac{3}{16}$ pollicis longæ. Pedicelli $\frac{3}{8}$ pollicis longi patentes tomentosi. Sepala acuta ovata extus rufo-tomentosa, intus prasina glabra, $\frac{1}{8}$ pollicis longa, mento obtuso lato æquilongo. Petala linearia oblonga glabra rufo-violacea. Labellum ungue elongato anguste canaliculato virescente, lobis lateralibus oblongis falcatis viridibus. Epichilio decurvo ovato quadrato obtuso albo tenui. Columna alta viridis, basi excavato rubro-marginato. Anthera plana tenuis loculis 8. Pollinia 8, æqualia anguste pyriformia disco parvo. Rostellum minutum bidentatum. Stigma latum scutiforme.

Sumatra, at Jambi (cult. in Hort. Bot. Singapore, Feb. 1894).

Though somewhat aberrant, this plant must be classed with the section *Æridostachyeæ*, and is perhaps as nearly allied to *E. dasystachys* Ridl. as to any species. The short thick bulb wrapped in brownish purple sheaths with raised white nerves is peculiar for this section. The flowers are few and not very woolly. The narrow channelled lip with curious green recurved lateral lobes and ovate white mid-lobe is a very distinctive character. At the foot of the column is a nectary formed by a triangular depression, and below the broad stigma are two raised bosses.

E. (§ Trichotosia) **pensilis**, sp. n. Caules validi ultra pedales. Folia oblonga obliqua acuminata acumine obtuso inæquilatera, nervis pluribus elevatis, superne ferme glabra, subtus pubescentia, $4\frac{1}{2}$ pollices longa, $1\frac{1}{4}$ pollicis lata, vaginis pollicaribus pubescentibus. Racemi penduli $1\frac{1}{4}$ pedis longi, rachide rufo-tomentoso flexuoso, floribus ad dissitis. Bracteæ ovatæ, $\frac{1}{4}$ pollicis longæ. Flores ferme sessiles rufo-tomentosi, $\frac{1}{2}$ pollicis lati. Sepalum posticum angustum lanceolatum, lateralia triangularia hispida, mento brevi obtuso. Petala linearia curva glabra breviora. Labellum carnosum sepalis brevius angustum, ungue marginibus elevatis lobis lateralibus parvis falcatis, lobo medio ovato cuspidato cuspide decurvo. Columna brevis crassa subquadrata, stelidiis brevibus obtusis. Capsula elliptic, $\frac{1}{2}$ pollicis longa, perianthio marcido coronata.

Sumatra. On trees on the Mandau river near Siak; Nov. 1898.

Allied to *E. vestita* Lindl., but distinct in the shorter and broader flowers, triangular sepals, and short blunt mentum. The lip is also narrower and short, with small falcate lateral lobes, and the column is short and broad. The flowers are very dull greenish white.

E. (§ Trichotosia) **hispidissima**, sp. n. Planta pusilla, radicibus tenuibus copiosis, caulibus erectis tenuibus ad 6 pollices longis hispidis. Folia linearia acuminata, $\frac{1}{2}$–$\frac{3}{4}$ pollicis longa vix $\frac{1}{8}$ pollicis lata, dense sericeo-hispido. Racemi plures graciles, $\frac{3}{4}$ pollicis longi flexuosi hispidi. Flores parvi, $\frac{1}{8}$ pollicis longi, 5–6 dissiti sessiles. Bracteæ lanceolatæ ovatæ. Sepala lanceolata extus hispida. Petala lanceolata glabra minora. Labellum oblongum integrum glabrum.

Columna crassiuscula. Anthera pro flore magna cordata. Capsula $\frac{1}{8}$ pollicis longa hispida, perianthio marcido coronata.

Selangor, at Ulu Langat (*J. Goodenough*).

This is the smallest species of this section known to me, very distinct in its slender stems with linear leaves and exceedingly small flowers. The whole plant is covered with soft woolly grey hairs, except the petals, lip, and column. The racemes, apparently extra-axillary, are very slender and flexuous, bearing from four to six exceedingly small flowers, which resemble in form those of the other species of the genus, but the mentum formed by the base of the lower sepals is hardly visible, and the lip is quite entire.

CLADERIA VIRIDIFLORA Hook. fil. I met with this plant in the woods of the Bongaya river, in Labuk Bay, North-east Borneo. This is the most eastern locality for this plant yet known.

CŒLOGYNE PANDURATA Lindl. I find this very common in Selangor, growing on trees overhanging streams at Rawang, Kwala Kubu, and elsewhere.

C. ASPERATA Lindl. I saw great plenty of large plants of this in Sumatra on trees by the Mandau river near Siak, Sumatra.

CALANTHE CECILIÆ Rchb. fil. Abundant in the woods at the foot of the limestone rocks at Gua Batu, Selangor. The colouring of the flowers varies from nearly pure white to violet. I have received plants from Indragiri, in Sumatra, exactly similar to those of Selangor, but of a darker violet.

C. VESTITA Lindl. I found a single plant of this in flower in a hole of a tree on the top of the limestone rocks at Gua Batu, Selangor. It was in flower in December. The species, well known from Tenasserim and Borneo, has not hitherto been found in the Malay Peninsula.

C. ? GIGANTEA Hook. fil. Flor. Brit. Ind. v. 856. A specimen of this plant, collected by Mr. Wray in Perak and sent me by Dr. King, proves to be *Plocoglottis fœtida* Ridl.

BROMHEADIA APOROIDES Rchb. fil. Mandau river, near Siak, Sumatra; not previously recorded for this island.

EULOPHIA SQUALIDA Lindl. Not uncommon near Sandakan, British North Borneo.

Saccolabium Angræcum, sp. n. Caulis pollicaris. Folia lanceolata falcata obtusa obliqua, coriacea, 2 pollices longa, $\frac{5}{8}$ pollicis lata. Racemus brevis, $\frac{3}{4}$ pollicis longus, rachide incrassato complanato. Bracteæ oppositæ ovatæ acutæ brevissimæ, circiter 16. Flores singulatim expansi albi, pedicellis $\frac{1}{4}$ pollicis longis. Sepala elliptica acuta mucronulata, $\frac{1}{4}$ pollicis longa. Petala angustiora, basi angustato. Labellum ad basin columnæ adnatum ungue brevi, lobis lateralibus oblique obovatis inæquilateralibus minute denticulatis, lobo medio minimo cordato, calcare pendente clavato ferme, $\frac{1}{2}$ pollicis longo. Columna brevis lata apoda. Anthera depressa lata paullo elevata. Pollinia 2, ovoideo-globosa, pedicello tenui, disco parvo scutiformi. Stigma latum transversim ellipticum.

Rostellum elongatum gracile acuminatum. Capsula triquetra, 1½ pollicis longa.

Selangor. On trees at the limestone rocks near Kwala Lumpor.

This is a rather remarkable little plant with exactly the habit of a *Dendrocolla*, but with flowers at first sight resembling those of some *Angræcum*. The lip is very peculiar in having two large spreading lateral lobes, obliquely obovate, between which there is a small ovate inconspicuous terminal lobe. At the base of this is the entrance to the spur, which is edged with an elevated yellow ridge, and at the base are two red dots. The spur is long, narrow, and club-shaped. The column short and broad, with a very large transversely oval stigma. It is difficult to refer the plant to any genus, as it differs in the floral characters from any *Saccolabium* known to me, and though the habit is that of *Dendrocolla*, the absence of any foot to the column and the long spur are against referring it to that genus. At present it is perhaps best placed under *Saccolabium.*

S. secundiflorum, sp. n. Caulis pollicaris. Folia lorata inæqualiter biloba obtusa coriacea atro-viridia ad 6. Racemus 2-pollicaris gracilis. Flores 6, secundi parvi. Sepalum posticum lanceolatum acutum album, lateralia lanceolata obtusa. Petala linearia oblonga, alba apicibus violaceis. Labellum basi saccato, lobis lateralibus oblongis acutis albis flavescentibus, lobo medio basi angustato apice dilatato obtuso, calcare pedicello æquali arcuato obtuso, callo conico in ore. Columna brevis viridis, stelidiis linearibus erectis. Anthera rotundata rostro lineari-lato bifido longe recurvo. Pollinia 2 globosa, pedicello lato-lineari, disco majore oblongo canaliculato.

Singapore, at Chua Chu Kang; Aug. 6.

A small plant with dull inconspicuous flowers in a secund raceme. The lip possesses two side lobes, between which is a saccate portion leading to the curved rather thick spur which has a small callus in the mouth. The mid-lobe is narrow at the base, with a thick apex, the sides of which are turned up and papillose; beneath it is a short blunt process. The anther has a long linear flat beak, notched at the end, very large in proportion to the rest of the anther. The pollinia are chiefly remarkable for the long disc much larger than the pedicel, much after the style of that of *S. perpusillum* Hook. fil.

S. cortinatum, sp. n. Caulis brevis, $\frac{1}{4}$–$\frac{1}{2}$ pollicis longus. Folia 4–7, oblongo-lanceolata obliqua, basi angustato, 2 pollices longa, $\frac{5}{8}$ poll. lata aut minora carinata obtusa. Racemi graciles 4-pollicares multiflori. Flores parvi dissiti brevissime pedicellati. Bracteæ parvæ lanceolatæ acuminatæ, $\frac{1}{16}$ pollicis longi. Sepala angusta lanceolata acuminata rubra. Petala latiora obtusa. Labellum saccatum integrum apice acuminato flavum. Columna brevissima. Anthera cordata rostrata, filamento lato. Pollinia non visa. Rostellum grande bidentatum lobis semiovatis acuminatis. Capsula elliptica.

Selangor; high up on the limestone rocks near Kwala Lumpur. Rare.

A very curious little plant with broad rather fleshy leaves oblique and sometimes almost subspathulate. The flowers are very small, red and yellow, borne in slender racemes. The lip is in the form of a sac ending in a point, resembling that of some *Thrixspermum*. It is curved up so as to cover the column. The rostellum is somewhat peculiar, the two lobes into which it is split forming an ovate-acuminate body. It is very large in proportion to the column, and nearly closes the mouth of the coalscuttle-shaped lip. It is rather difficult to refer this to the neighbourhood of any species. The form of the lip would naturally induce one to class it as a *Thrixspermum*, but as in other respects it resembles other *Saccolabia*, I have referred it to that genus.

Dendrocolla carnosa, sp. n. Caulis bipollicaris, radicibus copiosis. Folia plura approximata, anguste lineari-lanceolata acuminata acuta crassa, carnosa superne canaliculata purpurascenti-atroviridia, 3 pollices longa, $\frac{1}{4}$ pollicis lata, vaginis $\frac{1}{4}$ pollicis longa costata purpurea. Racemi plures pedunculis gracilibus purpureis 3-pollicaribus, paullo incrassati, pollicares. Bracteæ quaquaversæ breves ovatæ acutæ. Flores parvi, pedicellis gracilibus, $\frac{1}{4}$ pollicis longis. Sepala oblonga ovata flava. Petala subsimilia. Labellum quam petala breviora, lobis lateralibus longis et latis, disco medio saccato lobo medio carnoso obtuso, pulvino tomentoso ad basin.

Penang (*Curtis*); Sept. 1897.

Allied to *D. pardalis* Ridl., with shorter peduncles, and differently coloured flowers. The lip is rather peculiar in having the erect lateral lobes meeting in the middle line so as to cover over a saccate nectary formed by the disc. The fleshy tongue-shaped apex (for as in nearly all species the lateral lobes are not distinctly marked off, except by texture) bears a small woolly papilla at its base.

ZEUXINE CLANDESTINA Bl. This inconspicuous plant was obtained first by Waitz in Eastern Java, and since then does not appear to have been collected again till last year, when a considerable number of plants appeared in the jungle of the Botanic Gardens in Singapore.

CYSTORCHIS VARIEGATA var. PURPUREA Ridl. A plant of this was brought me by a native on the Bongaya river, Labuk Bay, British North Borneo. It had previously been recorded from Western Java, Sumatra, and Pahang.

LECANORCHIS MALACCENSIS Ridl. I found fruiting plants of what appeared identical with the Malay Peninsula plant in the forest of Bongaya. It has not previously been recorded from Borneo.

POGONIA DISCOLOR Bl. has been found by Mr. Goodenough in Selangor. This plant has been only previously recorded from Siam (where it is known as the Elephant's Ear) and from Java.

MOSSES OF THE WNION VALLEY, MERIONETHSHIRE.

By James E. Bagnall, A.L.S.

In the early part of October, 1897, I had the pleasure of spending a few days with some friends at Bont Newydd, and during my stay I spent a few hours with them on the beautiful mountain Aran Mawddwy, which would well repay a more extensive visit than time then allowed. We also spent a morning on the beautiful woody slopes rising from the River Wnion to the Bala Road, above Bont Newydd; here I saw *Andreæa* on boulders at about 400 ft. above sea-level. A morning was given to the lanes leading to the "Torrent Walk," where the mosses on the walls and roofs and waysides were so abundant that we did not reach the specialty of the neighbourhood. An afternoon was given to a visit to the "Precipice Walk," and the lanes in its vicinity yielded quite a wealth of interesting species. On my last morning we paid a short visit to the Estuary and the interesting neighbourhood of Dolgelly, where on stone walls not more than 30–40 ft. above sea-level I saw *Andreæa petrophila*, and *A. Rothii* in good fruiting condition. I brought home considerable spoils of mosses and hepatics, and am convinced a longer visit and closer attention would yield a still richer harvest.

Sphagnum cymbifolium Ehrh. Aran Mawddwy; Bont Newydd. —*β squarrosulum* N. & H. Aran Mawddwy.—*S. papillosum* Lindb. Aran Mawddwy. — *β confertum* Lindb. Aran; Bont Newydd.—*S. molle* Sull. var. *tenerum* Braith. Aran Mawddwy. — *S. subsecundum* Nees. Bont Newydd.—*β contortum* Schp. Bont Newydd. —*S. acutifolium* Ehrh. Aran Mawddwy.—*β rubellum* Russ. Aran Mawddwy; Bont Newydd. — ι *fuscum* Schp. Aran Mawddwy.—*S. fimbriatum* Wils. Aran Mawddwy. — *S. intermedium* Hoffm. Bont Newydd.—*S. cuspidatum* Ehrh. Aran Mawddwy.

Andreæa petrophila Ehrh. Aran; Bont; Dolgelly. — *A. alpina* Sm. Aran Mawddwy; Bont Newydd, 400 ft.—*A. Rothii* W. & M. Aran Mawddwy; Bont Newydd; Dolgelly.—*δ falcata* Lindb. Aran Mawddwy; woody slopes, Bont Newydd. — *A. crassinervia* Bruch. Summit of Aran Mawddwy; woody slopes, Bont Newydd.

Catharinea undulata W. & M. Bont Newydd, &c., frequent.

Oligotrichum incurvum Lindb. Aran Mawddwy. — *β laxum* Braithw. Aran Mawddwy.

Pogonatum aloides Hedw. Bont Newydd, &c. — *β Dicksoni* Walm. Aran Mawddwy. — *P. urnigerum* L. Walls and rocks, Bont Newydd.

Polytrichum piliferum Schreb. Bont Newydd, &c., frequent.—*P. juniperinum* Willd. Aran Mawddwy; Bont Newydd.—*P. gracile* Dicks. Woody slopes, Bont Newydd.—*P. formosum* Hedw. Bont Newydd. — *P. commune* L. Bont Newydd; Aran Mawddwy.—*γ minus* Weis. Aran Mawddwy.

Diphyscium foliosum Mohr. Aran Mawddwy; lane to Precipice Walk.

Ditrichum homomallum Hpe. Lane to Precipice Walk.

Ceratodon purpureus Brid. Common.

Dichodontium pellucidum Schp. Boulders in Wnion.

Dicranella heteromalla Schp. Frequent. — *D. secunda* Lindb. Lane to Precipice Walk. — *D. squarrosa* Schp. Bank of Wnion, Bont Newydd.

Dicranoweissia cirrata Lindb. Woody slopes, Bont Newydd.— *D. crispula* Lindb. Railway bank, Bont Newydd.

Campylopus flexuosus Brid. Aran Mawddwy; Bont Newydd. — *C. pyriformis* Brid. Aran Mawddwy.—*C. atrovirens* De Not. Aran Mawddwy; Bont Newydd; Dolgelly.

Dicranodontium longirostre B. & S. Aran Mawddwy.—β *alpinum* Schp. Aran Mawddwy.

Dicranum scoparium Hedw. Aran Mawddwy; Bont Newydd, &c. —β *paludosum* Schp. Boggy places, Aran Mawddwy.—γ *orthophyllum* Brid. Bont Newydd; lane to Precipice Walk.—*D. Bonjeani* De Not. Woody slopes, Bont Newydd. — *D. majus* Turn. Aran Mawddwy; Bont Newydd.—*D. fuscescens* Turn. Bont Newydd; lane to Precipice Walk.—γ *congestum* Husn. Railway cutting, Bont Newydd.

Leucobryum glaucum Schp. Aran Mawddwy; Bont Newydd.

Fissidens viridulus Wahl. River-banks, Bont Newydd. — *F. incurvus* Starke. Banks, Bont Newydd.—*F. bryoides* Hedw. Frequent, Bont Newydd, &c. — *F. adiantoides* Hedw. Bont Newydd; lane to Precipice Walk; Dolgelly, rich in fruit. — *F. decipiens* De Not. River-banks and grounds, Bont Newydd. — *F. taxifolius* Hedw. Bont Newydd, lane to Torrent Walk.

Grimmia apocarpa Hedw. Walls and rocks, frequent. — β *rivularis* W. & M. Boulders in river, very fine. — γ *gracilis* W. & M. Walls about Bont Newydd.—*G. incurva* Schwgr. Aran Mawddwy. —*G. torquata* Hornsch. Aran Mawddwy.—*G. pulvinata* Sm. Frequent through the district. — *G. orbicularis* Bruch. Wall-tops, Dolgelly. — *G. trichophylla* Grev. Aran Mawddwy: Dolgelly.— *G. patens* B. & S. Aran Mawddwy.—*G. Doniana* Sm. Wall-tops, Dolgelly. — *G. ovata* Schwgr. Aran Mawddwy. — *G. commutata* Hüb. Aran Mawddwy.—*G. montana* B. & S. Aran Mawddwy.

Rhacomitrium ellipticum B. & S. Aran Mawddwy.—*R. aciculare* Brid. Boulders in River Wnion. — *R. protensum* Braun. Aran Mawddwy; Bont Newydd. — *R. fasciculare* Brid. Walls and rocks, Aran Mawddwy; Bont Newydd.—*R. heterostichum* Brid. Walls and rocks, frequent.—β *alopecurum* Hüb. Aran Mawddwy.—γ *gracilescens* B. & S. Aran Mawddwy.—*R. sudeticum* B. & S. Aran Mawddwy. — *R. lanuginosum* Brid. Walls and rocks, frequent. — *R. canescens* Brid. Walls and rocks, frequent.—β *ericoides* B. & S. Walls, lane to Precipice Walk.

Ptychomitrium polyphyllum Fürn. Walls and rocks, frequent.

Hedwigia ciliata Ehrh. Bont Newydd.—γ *viridis* Schp. Railway cutting, Bont Newydd.

Pottia truncatula Lindb. Bont Newydd, &c.

Tortula marginata Spr. Bont Newydd; lane to Precipice Walk. —*T. muralis* Hedw. Common.—β *rupestris* Wils. Railway bridge, Bont Newydd.—*T. ruralis* Ehrh. Bont Newydd.

Barbula rubella Mitt. Bont Newydd; Dolgelly.—*B. tophaceum* Mitt. Wall-tops, Dolgelly.—*B. fallax* Hedw. Bont Newydd, &c. —*B. cylindrica* Schp. Lane to Torrent Walk.—*B. vinealis* Brid. Lane to Precipice Walk.—*B. revoluta* Brid. Walls, Bont Newydd; Dolgelly.—*B. convoluta* Hedw. Railway bridge, Bont Newydd.—*B. unguiculata* Hedw. Footways, &c., Bont Newydd.

Weisia microstoma C. M. Lane to Precipice Walk.—*W. viridula* Hedw. Frequent, Bont Newydd.—*W. rupestris* C. M. Walls, Dolgelly.

Trichostomum mutabile Bruch. Rocks, Bont Newydd.—*T. tenuirostre* Lindb. Bont Newydd.

Cinclidotus fontinaloides P. B. Boulders in river, Bont Newydd.

Encalypta streptocarpa Hedw. Aran Mawddwy, frequent.

Anœctangium compactum Schwg. Bont Newydd.

Ulota Bruchii Hornsch. Woody slopes, Bont Newydd; lane to Precipice Walk.—*U. crispa* Brid. Bont Newydd; lane to Precipice Walk.—β *intermedia* Dixon. Lane to Precipice Walk.—γ *crispula* Hamm. Lane to Precipice Walk.

Orthotrichum rupestre Schleich. Rocks, Bont Newydd.—*O. leiocarpum* B. & S. Woody slopes, Bont Newydd.—*O. Lyellii* H. & T. Lane to Precipice Walk.—*O. affine* Schrad. Bont Newydd; lane to Precipice Walk.—*O. stramineum* Hornsch. Lane to Precipice Walk. —*O. diaphanum* Schrad. Bont Newydd.

Funaria hygrometrica Sibth. Bont Newydd.—β *calvescens* B. & S. Grounds, Bont Newydd.

Aulacomnium palustre Schwgr. Aran Mawddwy; Bont Newydd. —*A. androgynum* Schwgr. Bont Newydd.

Bartramia Œderi Sw. Rocks, Dolgelly.—*B. pomiformis* Hedw. Rocks, Dolgelly.—β *crispa* B. & S. Rocks, Dolgelly.—*B. Halleriana* Hedw. Rocks, Dolgelly.

Philonotis fontana Brid. Aran Mawddwy; Bont Newydd.—*P. calcarea* Schp. Dolgelly.

Breutelia arcuata Schp. Aran Mawddwy; Bont Newydd.

Webera polymorpha Schp. Lane to Precipice Walk.—*W. elongata* Schwgr. Lane to Precipice Walk.—*W. cruda* Schwgr. Aran Mawddwy.—*W. nutans* Hedw. Frequent, Bont Newydd.—*W. annotina* Schwgr. Bont Newydd.—*W. albicans* Schp. Lane to Precipice Walk.

Bryum inclinatum Bland. Wall, Bont Newydd.—*B. pallens* Sw. Grounds, Bont Newydd.—*B. pseudo-triquetrum* Schwg. Aran Mawddwy; Bont Newydd.—*B. cæspiticium* L. Common, rocks and walls.—*B. capillare* L. Common, walls.—*B. erythrocarpum* Schwgr. Railway cutting, Bont Newydd.—*B. alpinum* Huds. Aran Mawddwy; Dolgelly.—*B. argenteum* L. Grounds, Bont Newydd. —β *majus* B. & S. Grounds, Bont Newydd.—γ *lanatum* B. & S. Grounds, Bont Newydd.

Mnium undulatum L. Frequent.—*M. hornum* L. Frequent.—*M. serratum* Schrad. Aran Mawddwy; Bont Newydd.—*M. punctatum* L. Aran Mawddwy; Bont Newydd.

Fontinalis antipyretica L. Boulders in River Wnion.

Pterygophyllum lucens Brid. River-bank, Bont Newydd.

Porotrichum alopecurum Mitt. River-banks, Bont Newydd.

Heterocladium heteropterum B. & S. River-banks, Bont Newydd. —β *fallax* Milde. On stones, Bont Newydd.

Thuidium tamariscinum B. & S. Aran Mawddwy; Bont Newydd. —*T. delicatulum* Mitt. River-bank, Bont Newydd.

Climacium dendroides W. & M. Aran Mawddwy; Bont Newydd.

Isothecium myurum Brid. Abundant, Bont Newydd.

Pleuropus sericeus Dixon. Walls, Bont Newydd.

Brachythecium albicans B. & S. Bont Newydd. — *B. rutabulum* B. & S. Bont Newydd, &c. — *B. velutinum* B. & S. Frequent, Bont Newydd. — *B. populeum* B. & S. Bont Newydd. — *B. plumosum* B. & S. Aran Mawddwy; Bont Newydd. — β *homomallum*. Boulders in River Wnion.—*B. purum* Dixon. Frequent, Bont Newydd, &c.

Hyocomium flagellare B. & S. Aran Mawddwy; Bont Newydd.

Eurhynchium piliferum B. & S. Railway cutting, Bont Newydd. — *E. prælongum* B. & S. Frequent. — *E. Swartzii* Hook. Bont Newydd. — *E. tenellum* Milde. River-banks, Bont Newydd. — *E. myosuroides* Schp. Aran Mawddwy; Bont Newydd. — *E. striatum* B. & S. Woody slopes, Bont Newydd. — *E. rusciforme* Milde. River Wnion; Bont Newydd. — *E. confertum* Milde. Bont Newydd.

Plagiothecium Borrerianum Spr. Banks, Bont Newydd. — *P. denticulatum* B. & S. Common, Bont Newydd. — *P. undulatum* B. & S. Aran Mawddwy; Bont Newydd.

Amblystegium serpens B. & S. Frequent, Bont Newydd. — *A. filicinum* De Not. Bont Newydd, &c.

Hypnum riparium L. River-banks, Bont Newydd.—*H. stellatum* Schreb. River-banks, Bont Newydd. — *H. chrysophyllum* Brid. Aran Mawddwy. — *H. commutatum* Hedw. River-banks, Bont Newydd.— *H. cupressiforme* L. Bont Newydd, &c. — β *resupinatum* Schpr. Bont Newydd. — δ *minus* Wils. Woody slopes, Bont Newydd. — ζ *ericetorum* B. & S. Woody slopes, Bont Newydd.— η *tectorum* Brid. Thatched roof, Bont Newydd. — *H. molluscum* Hedw. Aran Mawddwy.—γ *fastigiatum* Bosw. Aran Mawddwy.— *H. palustre* L. Boulders in river, Bont Newydd. — *H. eugyrium* Schp. Boulders in river, Bont Newydd. — *H. ochraceum* Turn. Boulders in river, Bont Newydd. — *H. sarmentosum* Wahl. Aran Mawddwy. — *H. cuspidatum* L. Frequent, Bont Newydd. — *H. Schreberi* Willd. Bont Newydd; Dolgelly.

Hylocomium splendens B. & S. Aran Mawddwy; Bont Newydd. — *H. brevirostre* B. & S. River-bank, Bont Newydd. — *H. loreum* B. & S. Aran Mawddwy; Bont Newydd.— *H. squarrosum* B. & S. Frequent, Bont Newydd.—β *calvescens* Hobk. Near Cader Idris.— *H. triquetrum* B. & S. Bont Newydd.

TWO NEW QUEENSLAND CYMBIDIUMS.

By A. B. Rendle, M.A., F.L.S.

Cymbidium Sparkesii, sp. nov. Eximia pseudobulbis magnis, foliis hysteranthiis; pedunculo cylindrico rubro-lurido, in parte inferiore bracteas ovato-triangulas membranaceas gerente, racemo suberecto multifloro, bracteis minutis triangulis; floribus atrate rubro-luridis; sepalis lineari-oblongis obtusiusculis, petala lateralia anguste lanceolata paullo superantibus; labello quam petala minore, pallido cum marginibus rubro-purpureis, trilobato, lobo medio magno, elliptico-oblongo, lobis lateralibus perbrevibus cum parte labelli inferiore columnæ margines celantibus, hac parte cristis geminis lamelliformibus crassiusculis pubescentibus instructa; anthera e basi truncata globosa.

Hab. North-east Queensland. Sent last autumn by Mr. Arthur O. Jones, J.P., of Geraldtown, Johnston's River, to Mr. J. Sparkes, by whom it was flowered and shown at the Royal Horticultural Society's meeting on April 26th. It is described as one of the orchids that make the woods black when in flower.

A fine species. The single specimen had four pseudo-bulbs, each about 5 in. long and half as broad, and a raceme of 50 flowers, which, with the lower non-floriferous portion of the pedicel, measured 18 in. in length; raceme 3½ in. in diameter. Bracts 3 mm. long. Pedicels 3·5 cm. long, like the rest of the flower coloured a deep lurid red, by transmitted light a rich deep crimson, the lip paler, the disc and keels a dirty yellowish white, and the margins crimson. Sepals 2 cm. long by 5 mm. broad, petals 16 mm. by 4·5 mm.; lip 12 mm. by 7 mm.; the pubescence is continued from the parallel median crests of the lower half about a third the way up on the upper portion. Column 7–8 mm. long, 2·5 mm. broad.

Near *C. canaliculatum* R. Br., but distinguished by its longer perianth-leaves and the uniform deep dark crimson of the flower, which in reflected light appears almost black.

Cymbidium Leai, sp. nov. Foliis linearibus obtusis plurinervosis, racemum laxum, ut videtur, excedentibus; bracteis minutis triangulis; floribus crassiusculis luteo-brunneis; sepalis elliptico-oblongis obtusis subpatentibus, petala oblanceolata paullo superantibus; labello glabro, petala vix æquante, trilobato, lobo medio rhomboideo cum apice rotundato paullo latiore, lobis lateralibus perbrevibus cum parte labelli inferiore columnam subamplectantibus, hac parte inferiore cristis geminis lateralibus humilibus et tuberculo rotundato intermedio instructa; columna subrobusta.

Hab. Sonata, Queensland, *Rev. T. S. Lea;* Sept. 3rd, 1886. "Brought from hills, and bloomed in verandah."

Leaves 20–30 cm. long by 2–2·2 cm. broad. Raceme (cut off at the base) 25 cm. long, bearing about a dozen flowers in the upper two-thirds. Pedicels stoutish, 2 cm. long or a little less. Sepals 12–13 mm. long by 6–7·5 mm. broad, somewhat irregular in shape, varying between almost oblong to elliptical. Petals 11–12 mm.

by 4–5 mm. Lip about 10–11 mm. long, fleshy, becoming thinner anteriorly and on the wing-like margins of the lower part; median lobe about 5 mm. long and nearly as broad at the tip; side lobes 1 mm. long; lower part of lip 6 mm. long and nearly as broad, the disc having a long tongue-like depression between the shallow lateral crests, which passes on to the base of the upper half, and bears below the latter a button-like tubercle. Column 6 mm. long by 3·5 mm. broad.

Near *C. canaliculatum* R. Br., but distinguished by its blunter broader sepals and lip-structure.

The types of these species are in the British Museum Herbarium.

HELLEBORUS OCCIDENTALIS IN BERKSHIRE.

By G. Claridge Druce, M.A., F.L.S.

In reviewing my *Flora of Berkshire* in the *Journal of Botany* for March, Mr. Britten thought it necessary to say that I had included *Helleborus occidentalis* of Reuter and some other forms among the plants of the county on what he is pleased to call insufficient evidence. I propose therefore to discuss the reasons which induced me to identify our Berkshire plant with the *H. occidentalis* of Reuter, which is made a subspecies of the *H. viridis* of Linnæus by Prof. Schiffner in his monograph of the genus.

As the *Catalogue des graines recueillies en 1868 et offertes en échange par le Jardin Botanique de Genève*, in which Reuter published his description, is scarce, I give a copy of his diagnosis:—

"*Helleborus occidentalis* Reut. mss. D. H. caule bifido vel subdichotomo ramoso foliisque glabris, folio radicali solitario palmatipedato reticulato-venoso, segmentis lanceolatis simplicibus bi- vel trifidis serrulatis, caulinis trisectis segmentis bi- vel trifidis; floribus 2–3 ad apices ramorum, sepalis ovatis plus minus inter se imbricatis vel contiguis, apice acutiusculis vel subapiculatis, carpellis transverse nervosis, stylo subincurvo bis breviori superatis, seminibus atris subtrigonis reticulato-insculptis nitidulis. Hab. in Gallia occidentali circa Pau (Kiener?), Deux-Sèvres (Sauze et Maill.), Agen (Godron) etc., in Pyrenaeis centralibus supra Luchon, Gendre, Gaviare, etc., in Mont. Hispan. boreal. inter Bilbao et Santander, et in Britannia. *H. viridis*, Bot. Gallic. ex parte. *H. viridis*, Engl. Bot. t. 200 optime. Differt ab *H. viridi*, glabritate, floribus minoribus, 2–3 in unoquoque ramo nec 1–2, sepalis magis ovatis, carpellis brevioribus; stylo incurvo.

"Deux plantes ont été confondues sous le nom de *Helleb. viridis;* la phrase de Linné étant trop incomplète ne pont trancher la question; cependant il indique sa plante à de Vienne et en Suisse; celle de Willdenow convient tout à fait à notre plante de Suisse, ainsi que les figures de Jacquin, Fl. Austr. t. 106, et de Reichenbach, Ic. Germ. t. 105. L'espèce habite l'Europe orientale depuis le

Dauphiné (Personnat in Bulletin Soc. Bot. de France, vol. xiii. p. 135, qui distingue les deux espèces, mais qui prend celle-ci pour une espèce nouvelle admettant la plante de l'Ouest pour le vrai *H. viridis*), la Savoie, le Piedmont, l'Italie septentrionale, la Suisse, l'Allemagne et l'Autriche. Les caractères qui distinguent les deux espèces ne sont pas très absolus et varient chacun dans certaines limites, mais le port est très distinct et se conserve par la culture; la première a les fleurs plus petites et plus nombreuses, 2–4 sur chaque rameau, quelquefois ne dépassant pas la grandeur de celles de *H. fœtidus*. La deuxième a les feuilles et la tige finement pubescentes a l'état jeune, les fleurs 1–2 sur les rameaux d'un vert clair jaunâtres à sépales arrondies ordinairement largement imbriqués entre eux. L'*H. Bocconi* Ten., qui habite la Dalmatie et l'Italie méridionale, est très-distincte par ses feuilles multifides, etc."

In this description it will be noticed that Reuter records his plant from Britain, and moreover says that the figure of *H. viridis* in the first edition of *English Botany* well [*optimè*] represents his *H. occidentalis*.

Prof. Dr. Victor Schiffner, in his monograph of the genus *Helleborus* which appeared in Engler's *Botanische Jahrbücher* for 1890 (see p. 118), as I have said, gives subspecific rank only to *H. occidentalis*. He cites as synonyms not only the *English Botany* plate referred to by Reuter, but also the plate numbered 34 in Curtis's *Flora Londinensis*, and the description in Smith's *Flora Britannica*, p. 398. He says:—"Differt ab *H. viridi* Linn. foliorum radicalium segmentis pro more latioribus, grosse serratis, subtus glabris (vel juventute inconspicue pilosis) læte viridibus haud pruinosis; scapo graciliore; foliis caulinis maximis 3–5-fidis, inferioribus sæpius longius vaginato-petiolatis, marginibus grosse fere inciso-dentatis; floribus paulum minoribus, sepalis angustioribus haud pruinosis eoque plus minus læte viridibus; carpellis brevioribus. Geogr. Verbreitung: *H. occidentalis* gehört dem westlichen und sud-westlichen Europa an, wo er auf Kalkboden verbreitet und stellenweise häufig ist*. . . Ebenso durch England, fehlt aber in Schottland."

In the clavis Prof. Schiffner separates the two subspecies as follows:—"Bl. kahl, Segmente grob gezähnt; Hochbl. sehr gross, sehr grob gezähnt; Blt. gelblichgrün, klein oder mittelgross (westeuropäische Pflanze) = *H. occidentalis*. Bl. etwas behaart mit unterseits vortretenden Nerven, mattgrün, etwas bereift, Segmente mittelmässig fein gezähnt; Blt. mittelgross; Sepalen breit grün etwas bereift; Narben aufrecht = *H. viridis*."

I have no hesitation in stating our Berkshire plant is well represented in the plate of *H. viridis* in Curtis's *Flora Londinensis*, and in that of *English Botany*, both of which are identified as *H. occidentalis* by Prof. Schiffner. I have collected the restricted *H. viridis* in Austria, Switzerland, Italy, and France, and I have gathered *H. occidentalis* in the Pyrenees. This was the evidence on which I based my statement (which Mr. Britten has not correctly quoted) that *H. occidentalis* is the Berkshire plant; I did not say "appears to be," but I said it "appears to be the common western form." Mr. Britten taunts me with using the phrase, "It appears to be the common western form, chiefly differing from the type in being glabrous." It would have been more satisfactory if Mr. Britten had brought some evidence on which we could rely rather than his own *ipse dixit.* We have the definite statement by Prof. Schiffner, which I have quoted, that *H. occidentalis* is the "westlichen und sud-westlichen" plant. Now as to my use of the term "chiefly differing from the type in being glabrous." As any unprejudiced reader will see, my reference was necessarily as brief as possible, and I chose the most striking character which could be readily grasped by the reader. To show that this character was appreciated by one eminent botanist, I may say that in the herbarium of the Jardin des Plantes at Paris, Dr. Grenier has written on an abnormal specimen that he refers it to *H. occidentalis* because *H. viridis* Linn. is a hairy plant ("qui est poilue"). Prof. Schiffner, in the clavis, also uses the term "behaart" for *H. viridis.* Doubtless there are other characters, and I place considerable stress on the more deeply-cut serrations of the leaves; but I see no reason for altering in the slightest degree the statement in my *Flora* which Mr. Britten criticises.

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* I omit the continental distribution.

In the excellent *Flore de France*, by Rouy and Foucaud (which unfortunately I did not see till after my *Flora of Berkshire* was printed), and in which I am glad to find great attention is paid to critical forms, the authors say of the aggregate *H. viridis* :—"Plante variable à laquelle nous attribuons les variétés suivantes pour la flore française; ses variétés du reste passent souvent de l'une à l'autre, surtout dans les régions montagnes du sud-est." They say that "Des plantes du Calvados, de l'Orne, des Hautes-Pyrénées, et des Alpes-Marit. réunissent les var. *occidentalis* et *viridis*," &c. Like myself, they call Reuter's plant var. *occidentalis*, and do not take up var. *Smithiana* A. Br. They diagnose the true *H. viridis* thus:—"Feuilles radicales à segments oblongs lancéolés, à dentelure fine et régulière, dressée, à pubescence assez fournie à leur base, à poils pluricellulaires; sépales larges, suborbiculaires, verdâtres. Var. *occidentalis* Reut. pro specie. Feuilles radicales à segments lancéolés assez profondément et irrégulièrement dentés, à dents étalées ou dressées, à pointe souvent déjetée; pubescence nulle à la base des segments ou à poils unicellulaires rares; sépales ovales ou ovales-oblongues, plus ou moins atténuées à la base, acutiuscules et subcucullés au sommet, verdâtres."

Rouy and Foucaud cite Schultz, *Herb. Normale*, n. s. no. 2106, for their *H. viridis.* This plant is labelled *H. occidentalis* by Schultz, but I pointed out to the curator of the herbarium at the Jardin des Plantes at Paris that it was not our Berkshire *H. occidentalis*, but *H. viridis;* this was before I had seen Rouy and Foucaud's reference.

In case there should be still any doubt in the mind of any unprejudiced reader respecting my statement that our Berkshire (and I add Oxfordshire and Buckinghamshire) plant is *H. viridis* var. *occidentalis*, I may state that a specimen of our Hellebore from Basildon was submitted to Prof. Schiffner recently. He replied to my query, "Your plant is undoubtedly *occidentalis*." I first pointed out that our Oxfordshire plant was *H. viridis* var. *occidentalis* in the *Journal of Botany* for 1890, p. 227.

In fact, therefore, instead of having insufficient evidence to call our plant by the name *occidentalis*, I think I have amply made good my statement; and now I ask Mr. Britten to produce evidence of the occurrence of the restricted *H. viridis*, although I must not be made to say that it does not occur, in Britain.

[Although I regret the acrimonious expressions which Mr. Druce has introduced into the foregoing note, I gladly print it in full, as it supplies the evidence on which he bases the determination of *Helleborus occidentalis* as a British plant. That evidence, which has hitherto been lacking—including, as it does, Prof. Schiffner's identification—is, I readily admit, amply sufficient to justify the introduction of the plant into our lists; and if as much can be said for the other varieties which Mr. Druce has recorded in the Berkshire Flora, I will readily withdraw my criticisms.

Mr. Druce says that he "pointed out that our Oxfordshire plant was *H. viridis* var. *occidentalis* in Journ. Bot. 1890, p. 227." This is hardly correct: what he there said was that it "appears to be" that plant; and he now says it "appears to be the common western form." When I spoke of "our plant," I referred to the British, not especially to the Berkshire, form. Mr. Druce seems to think I have controverted his identification, for he speaks of my "*ipse dixit*," and asks me "to produce evidence of the occurrence of the restricted *H. viridis* in Britain." But I have pronounced no *ipse dixit*, nor have I have formed any opinion on this point; so I cannot comply with Mr. Druce's request.—James Britten.]

SHORT NOTES.

Fragaria muricata (p. 127).—I think any unprejudiced reader of my Berkshire Flora will perceive that I felt the citation of the *Species Plantarum* for *F. muricata* was not satisfactory, for I added immediately after it "Miller, Gard. Dict. ed. 8 (1768), 'The Hautbois Strawberry'"—a plan I have followed when there has been some doubt as to the correctness or completeness of the reference. The citation of the *Species Plantarum* was given because the Kew *Index* says: "*F. muricata* L. = *F. elatior*, *vesca*," and doubtless the authors of that work had some reasons for their statement. I did not select the name *F. moschata* Duchesne because Beck, in the *Flora Nieder Oesterreich*, queries it as being identical with *F. elatior*, and Grenier and Godron selected *F. elatior* Ehrh. in preference.—G. Claridge Druce.

[I print Mr. Druce's note, but I fail to see how it affects the point in question. Mr. Druce printed: "Fragaria muricata, Linn.

Sp. Pl. 495 (1753). Mill. Gard. Dict. ed. 8 (1768)." If by this he meant to say that he considered Miller's plant different from that of Linnæus (as I have shown it to be), he chose a very unusual way of doing so. I have already pointed out at some length (Journ. Bot. 1896, 271) the dangers which result from a misuse of the *Index Kewensis*. Mr. Druce is in error in saying that Grenier and Godron "selected *F. elatior* Ehrh. in preference," for the name they employ is *F. magna* Thuill., which, as I have already shown (Journn. Bot. 1898, 129) antedates Ehrhart's *elatior*.

I am glad Mr. Druce has called my attention to Grenier and Godron, for I am now able to explain what had hitherto puzzled me. Mr. Druce cited "*F. moschata et dioica* Duchesne, Hist. Nat. Frais. 145"; but no such combination exists in Duchesne's book, nor does the name *dioica* appear in his list. But I now find that Grenier and Godron cite "*F. dioica* et *moschata* Duch. dict. enc. 2, p. 536," and I have little doubt that this is the source of Mr. Druce's citation. But if he had looked up the *Encyclopédie Méthodique*, he would have found that Grenier and Godron had quoted incorrectly, for Duchesne there gives *Fragaria moschata* and *Fragaria moschata dioica*, but has no *F. dioica*.—James Britten.]

Basidiomycetes new to Britain.—The following species, I think, have not hitherto been published as British. Materials either in the form of drawings or examples, or both, are preserved in the Herbarium of the British Museum. They are illustrated on the coloured sheets of Basidiomycetes now in course of execution:—

Agaricus (*Amanita*) *aridus* Fr.—*A.* (*Pluteus*) *umbrinellus* Sommerf. —*A.* (*Entoloma*) *pluteoides* Fr.—*A.* (*Crepidotus*) *proboscideus* Fr.— *A.* (*Psalliota*) *dulcidulus* Schulz.—*A.* (*Psalliota*) *callosus* Fr.— *A.* (*Psathyra*) *Loscosii* Rabh.—*Coprinus tuberosus* Quel. This was given as the "first British record" by Mr. George Massee in the *Kew Bulletin* for "April" [published August or September], 1897, but the drawing has been exhibited in the Public Gallery since 1894. —*Cortinarius* (*Phlegmacium*) *vespertinus* Fr.—*C.* (*Phlegmacium*) *olivascens* Fr.—*C.* (*Inoloma*) *argutus* Fr.—*Lenzites heteromorpha* Fr. —*Boletus rutilans* Fr.—*B. candicans* Fr.—*Polyporus osseus* Kalch.— *P. imbricatus* Fr.—*P. corticola* Fr. The drawings are now complete to the end of the genus *Polyporus*.

A considerable number of other Basidiomycetes new to Britain have been found whilst the drawings have been in hand—too late for illustration on the sheets. Some of these, to the end of the *Agaricineæ*, are:—*Agaricus* (*Amanita*) *recutitus* Fr.—*A.* (*Lepiota*) *nympharum* Fr.—*A.* (*Tricholoma*) *coryphæus* Fr.—*A.* (*Tricholoma*) *hordus* Fr.—*A.* (*Tricholoma*) *elytroides* Fr.—*A.* (*Tricholoma*) *amicus* Fr.—*A.* (*Entoloma*) *porphyrophæus* Fr.—*Cortinarius* (*Hygrocybe*) *sciophyllus* Fr.

The following species of *Polyporeæ* and *Hydneæ* new to Britain have been sketched:—*Dædalea polyzona* P.—*Merulius aureus* Fr.— *M. squalidus* Fr.—*Hydnum fusipes* P.—*H. multiplex* Fr.—*H. pinastri* Fr.—*H. pulcherrimum* B. & Curt.—*Odontia cristulata* Fr. —Worthington G. Smith.

LEUCOBRYUM GLAUCUM IN FRUIT. — The fruit of this moss was found on April 12 by Mr. D. H. Jones and myself in the greatest abundance in a fertile valley about twelve miles from Harlech, Merionethshire (v.-c. 48). The fruit was in splendid condition, the calyptra being in many cases still present, and the fertile plants covered the ground for many square yards. Mr. Jones has also found *Fissidens polyphyllus* growing abundantly in Wilson's original locality near Aberglaslyn, Carnarvonshire (v.-c. 49). In September of last year I found *Tortula princeps* in some quantity on Moel-yr-dyd, Carnarvonshire, at an elevation of about 1500 ft., and Mr. Jones, who went last week to get me a further supply, informs me that he came across it in several places high up on the same mountain. *T. princeps* has not been previously recorded, I think, for Wales. I shall be glad to send specimens of any of the above to anyone desirous of obtaining them, if they will address me at 44, Brompton Square, London, S.W.—E. CHAS. HORRELL.

POA FLEXUOSA Wahl. IN BRITAIN.—Last August, during my search for *Carex helvola*, I found a *Poa* in small quantity on the south-west cliffs of Ben Lawers, which was new to me. Prof. Hackel writes to me, in a letter received this day (14th March), that it is identical with specimens from the Dovrefield of *Poa flexuosa* Wahl.—the *Poa arctica* Brown, which is put by Nyman as a subspecies of *Poa cenisia* of Allioni. It has not been previously recorded for Great Britain. —G. CLARIDGE DRUCE *in Ann. Scottish Nat. Hist. for April.*

VERONICA POLITA. — About 100 yards of roadside near Welwyn were noticed covered with *Veronica polita*, the flowers having commonly five petals—apparently by the splitting of the lower petal to its base. Abundance of such flowers were to be found. Has this been noticed elsewhere?—G. L. BRUCE.

NOTICES OF BOOKS.

RECENT LITERATURE ON MARINE ALGÆ.

The number (tom. iv. nos. 1–6) of the *Annales des Sciences Naturelles*, published in November, 1897, contains two papers on marine algæ: "Sur deux Floridées nouvelles pour la flore des Canaries," by Miss Karsakoff; and a "Contribution à la flore algologique des Canaries," by Miss Vickers.

Miss Karsakoff's paper consists of a minute description of two interesting algæ, found by Miss Vickers in Grand Canary. Upon one of them the author bases a new genus of *Ceramiæ*, named after the finder of the plant, *Vickersia*. A comparison is made with the neighbouring genera *Callithamnion*, in its wide sense, and *Griffithsia*, to both of which *Vickersia canariensis* bears resemblances. But the limits of neither of these genera are wide enough to admit the new plant, if only on account of the somewhat peculiar mode of attachment of the tetraspores, the only fruit known at present for the new genus. The nearest ally of

V. canariensis is *Callithamion baccatum* J. Ag., which occurs at the Azores. The fruit of this plant has never been described, and till this is found it is, of course, not possible to be quite certain as to its affinities. However, the resemblance between *V. canariensis* and *C. baccatum* is too marked, as regards their vegetative characters, to allow of the two species being separated, and Miss Karsakoff has therefore placed *C. baccatum*, with a query, as a second species in her genus *Vickersia*.

The second alga described in this paper is *Phyllophora gelidioides* Crouan MS. This plant (no. 499 of Mazé and Schramm's *Algues de la Guadeloupe*) was first placed by Crouan in *Gelidium*, and later in *Phyllophora*, where Miss Karsakoff retains it. No description was ever given by Crouan, the name and locality only being published under *Gelidium ligulato-nervosum* in *Algues de la Guadeloupe*, p. 200. Miss Karsakoff shows that *Phyllophora gelidioides* is not identical with no. 1084 of the same collection, *Phyllophora* (*Phyllotylus*) *siculus* Kütz., with which it has been classed by Crouan in Herb. Thuret. From material of *Phyllophora gelidioides* collected by Miss Vickers at the Grand Canary, and from an examination of the original Crouan specimens, Miss Karsakoff has been able to draw up a diagnosis of the plant, and to draw comparisons between it and *P. siculus*. The plate, which contains two figures by M. Bornet, and several by the author, reminds one of the beautiful plates in the the *Notes Algologiques*.

Miss Vickers' paper consists of a list of 136 algæ, collected by her during a five or six months' stay in Grand Canary. Of these, thirty-five are new to the Canaries, and one, the *Vickersia canariensis*, mentioned above, is new to science. After each record the locality is given, and in most cases the month of gathering. Among other interesting finds are a distichous form of *Caulerpa Webbiana*; *Griffithsia barbata*, of which a unique specimen was dredged in the port of Luz; and *Sarcomenia miniata*, which finds a resting-place at the Canaries, being recorded from Cadiz and S. Africa. The collection is mainly the result of shore collecting, for Miss Vickers found that dredging was extremely laborious and difficult, on account of the heavy seas, and the large quantity of *Cystoseira abies-marina*, which choked the dredge. A graphic description of the coast is given, together with valuable information as to good localities for special plants and how to reach these. Altogether this paper gives one the breezy sensation of being on the shore, which makes the reading of it a pleasure; and it is a guide to all future algological work done in that region.

Major Reinbold publishes (*Nuova Notarisia*, ser. ix. April, 1898) the second part of his " Algen der Lacipede und Guichen Bay und deren näherer Umgebung." The first part, containing a list of 141 algæ, was published in *Nuova Notarisia*, ser. viii. April, 1897, and this addition brings the number to 272. The plants were collected and sent to Major Reinbold by Dr. Engelhart, who also presented a small collection to the British Museum. Though the coasts of S. and W. Australia have been well worked for algæ from the time of Harvey onwards, Major Reinbold in this last paper is able to describe two new species, *Cladophora conformis* and *Delesseria Lacepedeana*, as well as a new form of *Ceramium puberulum*, which he calls *spinosissima*.

The receipt of further specimens of *Gloiophyllis Engelharti* has enabled Major Reinbold to draw up a more complete diagnosis of this plant, which was described in the first part of this list (*l. c.*); and *Ectocarpus Sandrianus* is recorded, which has hitherto only been known from European waters. An interesting comparison is drawn between the vegetative structure of *Erythroclonium Mülleri* and that of *Rhabdonia verticillata*, a comparison which will be found most useful by anyone attempting to name young and sterile plants of these puzzling species.

Thamnocarpus glomuliferus has again been found, and again without fruit. Neither the cystocarps nor tetraspores of this alga have ever been seen, though the plant is well represented in the Bracebridge Wilson Herbarium, now in the British Museum, and specimens of it have been sent to the same institution from South Africa. It is strange that so many specimens, though collected in different localities and at different times of the year, should all be sterile.

A contribution to our knowledge of the genus *Bangia*, "Ueber *Bangia pumila* Aresch.," by Dr. O. V. Darbishire, is published by the Kommission zur wissenschaftl. Untersuch. d. deutschen Meere, Bd. iii. Heft 2. Tthe author rightly says this genus is in much need of revision, a work which can only be undertaken on fresh material; and it is to be hoped that Dr. Darbishire may see his way to undertaking this work himself. The species dealt with in the present paper, *Bangia pumila* Aresch., has been described and issued in exsiccatæ under other specific names, as is shown by the list of synonymy which follows the diagnosis of the plant. It is found on the eastern shores of the Baltic, in brackish or salt water, and Dr. Darbishire has been able to make a study of the plant in its natural conditions. He figures the vegetative and fruiting portions of the thallus in various stages, and shows the differences between this and other nearly allied species.

A paper "On the Classification of the *Tilopteridaceæ*" (Bristol Naturalists' Society's *Proceedings*, vol. viii. pt. ii. 1896–97) embodies the result of an investigation on this order by Mr. George Brebner. The author has made a careful study of the genera *Haplospora* and *Scaphospora*, specimens of which he obtained at Cumbrae. Though Dr. Reinke had suggested the identity of *H. globosa* and *S. speciosa*, the question remained unsolved until Mr. Brebner was so fortunate as to find a plant of *H. globosa* bearing sporangia, oogonia, and antheridia. This united the two genera in an unmistakable manner, and *Scaphospora speciosa* is sunk into *Haplospora globosa*, which has priority. Mr. Brebner draws up a modified diagnosis of the genus *Haplospora* and the species *H. globosa*. *H. Vidovichii* Born., which is made the foundation of a new genus

Heterospora by Kuckuck, is shown by Mr. Brebner to be distinct in several points from the *Tilopteridaceæ*, and he suggests placing it either in a suborder of *Ectocarpaceæ*, *Heterosporeæ*, or in a separate order by itself, "as it differs from all the true *Ectocarpaceæ* in having monospores."

The removal of *Choristocarpus tenellus* from *Tilopteridaceæ* also seems advisable to the author, and the order is thus reduced to the two genera *Tilopteris* Kütz., and *Haplospora* (Kjellm.) limit. mutat., which have for species *T. Mertensii* Kütz., *H. globosa* (Kjellm.) limit. mutat., *H. arctica* Kjellm. ?, and *H. Kingii* Farlow ? The two latter species are queried on account of their possible identity with *H. globosa*. Five conditions of *H. globosa* are given with regard to the reproductive organs: (1) Sporo-hermaphrodite; (2) Hermaphrodite; (3) Sporo-antheridic; (4) Sporo-oogonous; (5) Non-sexual; the second and fifth of these conditions being most common.

Although the actual process of fertilization has not been observed, Mr. Brebner shows that this does not take place through a cell-membrane, as "it is only the non-sexual spores that have the sporangium invested by a wall, the ova being uni-nucleate naked bodies." There is one plate, showing figures of *Haplospora globosa* and *Scaphospora speciosa*, which abundantly justify the author's conclusions.

The first part of a memoir by M. Sauvaugeau entitled "Sur quelques Myrionemacées" fills two numbers of vol. v. of the *Annales des Sciences Naturelles*, April, 1898. The date of the cover is 1897, but to prevent possible mistakes the editor has inserted a remark below, stating that the numbers were published in April, 1898. Discrepancies of this kind are, however, habitual to this publication, and have already been pointed out in this Journal.

M. Sauvageau deals firstly with the history of the various genera and species of this group, one which is, perhaps, more generally recognized as a suborder in *Chordariaceæ*. The genus *Elachistea* is here spelt accurately. Harvey cites it correctly in *Phycologia Britannica*, but later in the *Synopsis* gives it as *Elachista*, and in this he has been generally followed. The rest of the paper is devoted to an exposition of M. Sauvageau's views on the morphology and classification of *Myrionema* and the allied genera.

The first impression in glancing at this is one of utter confusion. The author reduces the genus *Myrionema* to one species, *M. vulgare* Thur., under which he places thirteen others from this and other genera,—a welcome relief after the somewhat profuse species-making indulged in by some botanists. But M. Sauvageau then proceeds to make three new species of *Myrionema*, and two new genera in *Myrionemaceæ*, reserving, however, all diagnoses both of genera and species for the second and still unpublished part of his memoir. It is to be regretted that M. Sauvageau should have decided to withhold these diagnoses, instead of publishing them together with the first mention of the new names.

The new species of *Myrionema* are *M. polycladum*, which was found at Gijon, growing on the thallus of *Fucus serratus* near the receptacles; *M. Corunnæ*, recorded on *Laminaria pallida* at Corunna, and on *L. flexicaulis* at Croisic; and *M. papillosum* on *L. saccharina* collected at Croisic and St. Vaast-la-Hougue. The name of this last species is peculiarly apt, since the upright filaments have a very papillose appearance as the result of abortive outgrowths which form lateral protuberances.

M. Sauvageau deals with *Ulonema rhizophorum* Foslie, and points out the strong resemblance between it and *Myrionema vulgare*, but for the present at least he maintains it as an independent species, while waiting for further opportunity of investigating the plant. The morphology of *Myrionema vulgare* is exhaustively dealt with by M. Sauvageau and accompanied, as indeed are all the species dealt with in this paper, by illustrations of the various points touched on. He deals at length with the growth of the basal portion, showing that in young plants the whole under surface adheres to the substratum while, as the plant grows the centre becomes detached, and rhizoids are formed to hold it fast. Instances are given of the power of the plant to repair injury from outside and an interesting section deals with the secretive apparatus of *Myrionema* which has never till now been noted.

M. Sauvageau has also new facts to show with regard to that most interesting growth in the *Phæophyceæ*, viz. the hairs. He finds that in *Myrionema*, as well as in certain species of other genera, the hairs have an endogenous growth, shooting up inside a short filament of cells, which persists to form a sheath round the base of the mature hair. The fact of the growing portion of these hairs being situated near their base would lead us to infer that their importance to the plant has caused this protection of the growing portion. Theories on the function of the hairs are not wanting, and that one which receives most support, and towards which M. Sauvageau himself leans, is that the thin walls and large surface area increase the power of the plant to absorb salts and gases from the sea-water. This fact of the differentiation of hair and sheath is, in M. Sauvageau's opinion, of sufficient importance to become a possible assistance in determining the affinities of the *Phæosporeæ*.

As regards the reproductive organs of *Myrionema vulgare* Thur. the author finds that besides the unilocular sporangia there are two kinds of plurilocular sporangia which he calls mega- and micro-sporangia, considering them the homologues of those of *Ectocarpus virescens*. He discusses them at length, and describes also the germination of the spores, which, he says, do not fuse. The examination of *M. vulgare* concludes with an interesting section on the power of the plant to resist death after the breaking up of its host plant, the result of experiments carried out by M. Sauvageau under artificial conditions. It is to be hoped that he may fulfil his intention of carrying out further experiments of a like nature on other genera of epiphytic algæ, and thus arrive at a solution of the question as to what becomes of them on the "seasonal disappearance" of their hosts.

The first of the new genera, *Hecatonema*, is founded on *Phyco-*

celis maculans Collins, which M. Sauvageau has found under three different forms. He considers that these are probably three successive conditions, but to facilitate the determination of specimens he describes each form separately and in detail. Pending the publication of the generic diagnoses, however, his reasons for the separation off of *P. maculans* to form a new genus are only to be gathered from a careful perusal of the text. The advisability of placing *Ascocyclus reptans* Rke. in *Hecatonema* is considered, but the point is not finally decided.

The second of the new genera is *Chilionema*, containing two new species, *C. Nathaliæ*, found by Miss Karsakoff growing on *Rhodymenia palmata* at Roscoff; and *C. reptans*, founded on *Ectocarpus reptans* Crn.; and *Myrionema reptans* Foslie. M. Sauvageau has been able to examine an authentic specimen of *E. reptans* Crn. in Herb. Thuret, and this he describes and figures. As the result of this examination he points out the differences which exist between this plant and the allied genera, justifying his formation of a new genus for its reception. *Ascocyclus ocellatus* Rke. is placed provisionally under *Chilionema*.

The author then treats of the genus *Ascocyclus*. He gives the name of "ascocystes" to the large hyaline cells characteristic of this genus, considering that they differ from the paraphyses of *Myrionema* and allied genera. Both the terms "paraphyses" and "assimilative filaments" are used somewhat loosely by phycologists in the genera of *Chordariaceæ*, and the latter term—a translation of the German "assimilationsfäden"—is never an entirely satisfactory one, especially when applied to the cells forming the periphery of such algæ, as for instance, *Chordaria* and *Soranthera*. M. Sauvageau removes from *Ascocyclus* all the species hitherto placed in it except the one on which the genus was founded by M. Magnus, *A. orbicularis*. He describes, however, two new species, *A. hispanicus*, which grows on *Saccorhiza bulbosa*, *Fucus serratus*, and *Himanthalia lorea*, at Rivadeo, in Spain; and *A. sphærophorus*, found by various collectors on French and Belgian coasts. The examination of *A. hispanicus* is rendered more than usually difficult by the presence of a minute species of *Ectocarpus* which grows intermixed with it, often adhering by means of rhizoids to the *Ascocyclus*. A full bibliography concludes the first part of this interesting memoir.

Ethel S. Barton.

African Botany.

Catalogue of the African Plants collected by Dr. Friedrich Welwitsch in 1853–61. Dicotyledons, Part II. Combretaceæ to Rubiaceæ. By William Philip Hiern, M.A., F.L.S. London: British Museum (Natural History); Dulau & Co. [April] 1898. 8vo, pp. 337–508. Price 4s.

Flora of Tropical Africa. By various Botanists. Edited by W. T. Thiselton-Dyer, C.M.G., etc., Director, Royal Gardens, Kew. London: L. Reeve & Co. 8vo, vol. vii. part i. pp. iv, 192. 1897. Part ii. pp. 193–384, 1898. Price 8s. net each.

Flora Capensis: being a systematic description of the plants of the Cape Colony, Caffraria, and Port Natal. By various Botanists. Edited by W. T. THISELTON-DYER, C.M.G., etc. London: L. Reeve & Co. 1897. Vol. vii. part i. 8vo, pp. 1–192. Price 7s. 6d. net.

THE steady progress of two long-suspended works which deal systematically with African plants is a matter for congratulation; and the various agencies which have brought pressure to bear in order to produce this effect may feel that they have not protested in vain against the delay which had for so long a period obstructed our knowledge of African botany. We have never hesitated to point out the unreasonableness of this delay, and we gladly welcome a return to a more satisfactory state of things.

The continuation of the Tropical African Flora, like that of the *Flora Capensis*, begins with the Monocotyledons, three volumes being left for the completion of the Dicotyledons. Dr. Dyer's name appears as editor of the work, as it does on the title-page of the Cape Flora: it is to be hoped that, when the work is completed, some steps will be taken to put this more correctly, as of course in each case the first three volumes of the work appeared very many years before any outcome of Dr. Dyer's superintendence. It is not, indeed, as we remarked on a former occasion, easy to see in what Dr. Dyer's share in the two Floras consists; in the instalments before us, for example, it seems limited to a note of ten lines on the cover of the Cape Flora and an introduction of two short pages to the first part of the *Flora of Tropical Africa*. We should have been glad if, in the exercise of his editorial capacity, he had prohibited the eccentricity which has lately characterized Kew nomenclature—we mean the spelling of the adjectival form of proper names with a small initial. This is not only contrary to general practice and the Berlin rules, but, as it seems to us, is also obnoxious to common sense. It is also to be regretted that in two Floras so much akin as those of the Cape and of Tropical Africa, an entirely different arrangement of printing the names of species should be adopted. In the former we have

"*Hypodiscus Willdenovia* (Mast. in Journ. Linn. Soc. x. 259)";

in the latter

"*Calathea conferta*, Benth. Gen. Plant. iii. 653."

It is true that in each case the method of printing adopted in the earlier volumes of each work has been followed; but so many other changes have been introduced, that this might well have been made.

The bulk of these two parts in the Tropical African Flora is contributed by Mr. Rolfe, who has monographed the *Orchideæ*, with the exception of *Disa* and *Brownleea*, which are by Mr. N. E. Brown. Of the other orders, the *Hydrocharideæ* and *Burmanniaceæ* are undertaken by Mr. C. H. Wright; the *Scitamineæ*, *Irideæ*, and *Amaryllideæ* fall to Mr. Baker. Mr. Rolfe, whose monograph appears to be very carefully done, describes a large number of new species and establishes a new genus, *Podandria*, for *Habenaria macrandra* Lindl.—a plant "remarkable for its enormously elongated anthers and long narrow segments."

More than half of the new part of the *Flora Capensis* is occupied by Dr. Masters's monograph of the *Restiaceæ*—an order on which he has long been the recognized authority: we note that in the clavis of the order, *Camnamois* is printed for *Cannomois*. Mr. Clarke begins his enumeration of the *Cyperaceæ*, in which the synonymy and the number of localities cited seem greatly in excess of the other orders; a curious inequality in the spaces left between the species—*e. g.* on pp. 159 and 165—gives a somewhat untidy appearance to this part of the work. Mr. C. B. Clarke also contributes the *Commelinaceæ*. Mr. Baker deals with the *Juncaceæ*, and Mr. N. E. Brown undertakes the *Aroideæ*, *Eriocauleæ*, and several small orders. We are glad to find that Mr. Arthur Bennett's help has been secured for the *Naiadaceæ*, an order which he has to a great extent made his own.

The preface to this part, like that to the part of the *Flora of Tropical Africa*, is dated December, 1897; the second part of the latter is merely dated 1898 on the cover. In view of the too well-known inconvenience that has arisen from the inaccurate or indefinite dating of books which have appeared in parts, we would suggest to Dr. Dyer the desirability of indicating clearly and unmistakably on each part of these Floras the exact date of its publication. It sometimes happens that copies are distributed privately before a book is actually published; and a preface dated December suggests that the actual printing-off and publishing of the work may not have taken place until the following January. The matter is the more important in view of the number of botanists who are now publishing descriptions of African plants; and the singular laxity which unfortunately prevails in the dating of the Kew *Bulletin* seems to render this caution the more necessary. Perhaps Dr. Dyer might be induced to extend the precaution we have suggested to the *Icones*, of which his name also stands as editor.

The continuation of Mr. Hiern's *Catalogue* of Welwitsch's plants, which was published in April, although smaller than its predecessor, contains a larger proportion of novelties, for the most part among *Rubiaceæ* of which more than a third are new. Among them are four genera—*Campylochiton* Welw., a Combretaceous genus which Mr. Hemsley had united with *Cacoucia;* and three Rubiaceous genera (*Pentacarpæa*, *Justenia*, and *Chalazocarpus*. A new name for the order *Oliniaceæ*—*Plectroniaceæ*—is of necessity introduced, as Mr. Hiern, for reasons which appear conclusive, retains Linnæus's name *Plectronia* for the genus which constitutes the order. He says:—"There seems little doubt but that Linnæus had a specimen of the genus under consideration when he described *Plectronia* for the *Mantissa* (1767), for his description and the specimen in his herbarium, subscribed in his own writing with the name *Plectronia ventosa*, now at the Linnean Society, both establish this view; he, however, complicated the matter by quoting a plate from Burmann of a plant in fruit which appears to belong to *Canthium* in *Rubiaceæ*, though he implied that he had not seen the plant figured in Burmann. In this way some authors have sunk the name of *Canthium* and substituted for it that of *Plectronia* for the Rubiaceous genus, while *Olinia* of Thunberg has been generally used for the true *Plectronia* L."

For an appreciation of Mr. Hiern's work, we must refer to our notice of the first portion of the Welwitsch *Catalogue* (Journ. Bot. 1897, 23–26); the part now before us is carried on on the same lines and with the same care which marked its predecessor. Certain changes in the nomenclature generally received will be noted: thus, *Adenia* Forsk. (1775) replaces *Modecca* Lam. (1797); *Colocynthis* "Tourn. ex Quer, Fl. Espan. (1764)" supersedes *Citrullus* Forsk. (1775); *Hariota* Adans. (1763) supplants *Rhipsalis* Gaertn. (1788). Other changes are: *Halimum* Loefl. (1758) for *Sesuvium* L. (1759); *Franchetella* O. Kunze for *Heteromorpha* Cham. & Schlecht. non Cass.; *Mamboga* Blanco (1837) for *Stephegyne* Korth. (1840?); *Ourouparia* Aubl. (1775) for *Uncaria* Schreb. (1789); *Neurocarpæa* Br. (1814) for *Pentas* Benth. (1844); *Sherbournia* G. Don (1855) for *Amaralia* Welw. (1873); *Myrstiphyllum* P. Br. (1756) for *Chasalia* DC. (1830); *Ouragoga* L. (1774) for *Cephaëlis* Sw. (1788); *Tardavel* Adans. (1763) for *Borreria* G. F. W. Meyer (1818).

As has already been noted (p. 157), the *Catalogue* is making steady and rapid progress at the hands of the various botanists who, with Mr. Hiern, are engaged on its completion, and already forms an important addition to our knowledge of the Flora of West Africa.

ARTICLES IN JOURNALS.[*]

Ann. Scott. Nat. Hist. (April).—S. M. Macvicar, 'Flora of Tiree' (cont.). — J. W. H. Trail, 'Topographical Botany of Scotland' (cont.).

Bot. Centralblatt (No. 13). — Z. Kamerling, 'Oberflächenspannung und Cohäsion.' — (No. 14). B. Nermer, 'Ueber die Ausbildung der achromatischer Kerntheilungsfigur.'—O. Loew, 'Ueber Protoplasma und actives Eiweiss.' — (Nos. 15–18). A. Fleroff, 'Pflanzengeographische Skizzen.' — (No. 15). P. Knuth, 'Wie locken die Blumen die Insekten an?'—(Nos. 17–18). W. Schmidle, 'Ueber *Cyanothrix* und *Mastigocladus*.' — (No. 19). P. Knuth, 'Beiträge zur Biologie der Blüten.' — P. Magnus, 'Bemerkungen zu P. Dietels Bearbeitung der *Hemibasidii* und *Uredinales*.' — (Nos. 20, 21). F. Brand, 'Culturversuche mit zwei *Rhizoclonium*-Arten' (1 pl.).—(No. 20). O. Loew, 'Vertretbarkeit von Kaliumsalen durch Rubidiumsalze bei niederen Pilzen.' — (Nos. 22, 23). Id., 'Ueber die physiologischen Functionem der Calciumsalze.'— F. W. E. Roth, 'Hieronymus Bock, genannt Tragus (1498–1554).'

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[*] The dates assigned to the numbers are those which appear on their covers or title-pages, but it must not always be inferred that this is the actual date of publication.

Bot. Gazette (18 Mar.).—J. Donnell Smith, 'Undescribed plants from Guatemala' (*Prosthecidiscus*, gen. nov. Asclepiad.: 1 pl.).—L. Guignard, 'Centrosomes in plants.'—B. L. Robinson, 'N. American *Caryophyllaceæ*' (1 pl.). — E. A. Burt, 'Collecting and preparing fleshy Fungi' (1 pl.). — W. C. Sturgis, 'Some aspects of vegetable pathology.' — E. J. Hill, *Potamogeton Robbinsii* (1 pl.).—A. Nelson, 'Wyoming Junipers.'—(15 April). W. F. Ganong, 'Polyembryony in *Opuntia vulgaris*' (1 pl.). — C. Robertson, 'Flowers and Insects.' —T. Holm, *Pyrola aphylla* (1 pl.). — J. H. Schaffner, 'Salt-marsh plants of N. Kansas.'—J. M. Greenman, 'Noteworthy plants of the Northwest.' — L. H. Bailey, 'Notes on *Carex*.' — D. H. Campbell, 'Systematic position of *Monoclea*.' — A. Nelson, 'Rocky Mountain species of *Thermopsis*' (1 pl.). — C. D. Beadle, 'Botany of South-eastern States.'—L. Lutz, 'Gum of *Canna*.'

Bot. Zeitung (16 April). — O. Spanger, 'Untersuchungen über die Wasserapparate der Gefässpflanzen.'

Bull. de l'Herb. Boissier (April–May). — H. Hallier, 'Neue und bemerkenswerte Pflanzen aus dem malaiisch-papuanischen Inselmeer' (7 pl.). — F. Stephani, 'Species Hepaticarum.' — T. de Heldreich, 'Flore de l'ile d'Égine.' — (April). R. Keller, 'Ueber die central- und südamerikanischen *Hyperica* des Herbarium Hanniense.'—M. T. Masters, 'De Coniferis.' —A. Chaubut, 'De l'abus de la Nomenclature.'—W. Barbey, *Sternbergia colchiciflora* (1 pl.).—R. Chodat, 'Plantæ Hasslerianæ' (Paraguay).

Bull. Torrey Bot. Club (19 March).—E. L. Greene, '*Compositæ* from New Mexico' (5 plates: *Wootonia*, gen. nov.).— L. M. Underwood, '*Selaginella rupestris* and allies.' — J. K. Small, 'Botany of Southern United States' (*Forcipella*, gen. nov. (*Paronychiaceæ*) = *Siphonychia Rugelii* Chapm.). — E. O. Wooton, *Rosa stellata*, sp. n. (1 pl.).—F. V. Coville, 'Marcey's Report on Red River of Louisiana.' —B. D. Halsted, 'Mycological Notes,' — (12 April). A. M. Vail, 'Studies in *Asclepiadaceæ*.'—M. A. Howe, 'New American *Hepaticæ*' (2 pl.). — A. A. Heller, 'New plants from Western N. America' (3 pl.). — A. Nelson, 'New plants from Wyoming.' — G. E. Osterhout, *Atriplex fruticulosa*, sp. n.*—(12 May). A. J. Grout, 'Revision of N. American *Eurhynchia*.' — E. O. Wooton, 'New plants from N. Mexico.'—A. A. Heller, 'New plants from Western N. America.' —G. Macloskie, 'Heat of imbibition by seeds.'— A. Nelson, 'New plants from Wyoming.'

Erythea (10 April).—C. V. Piper, 'New Washington Plants.'

Gardeners' Chronicle (2 April). — J. Lowrie, 'Home of *Caryota urens*.' — *Aloe Schweinfurthii* (fig. 76). *Eulophiella Peetersiana* (fig. 76 & plate). — (21 May). *Passiflora Imthurnii* Masters, sp. n. (fig. 114).

Journal de Botanique (16 Feb.). — A. de Coincy, 'Flore de l'Espagne.' — M. Mirande, 'Malate et malophosphate de calcium dans les végétaux' (concl.).—(16 Feb., 1 March). P. de Sveschnikow, 'Hépatiques recueillies dans le sud de la Russie.' — (1 Mar.). M. Boudier, *Chitonia Gennadii*, sp. n. — A. Franchet, *Souliea*, gen. nov. (Ranunculaceæ).—(1 & 16 Mar.). M. Mirande, 'Sur les laticifères et les tubes criblés des Cuscutes monogynées.' — (16 Mar. & 1 April). — E. G. Camus, 'Plantes hybrides spontanées de la flore européenne.' — ("1 April") (received 25 May). P. Van Tieghem, 'Sur le genre *Simmondsia*.'

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* This name is corrected in the May *Bulletin* to *A. eremicola*, *A. fruticulosa* being preoccupied.

Journ. Linn. Soc. (Bot.).—(1 April). Sir J. Lubbock, 'Attraction of flowers for insects.' — W. & G. S. West, 'Desmids of United States' (3 pl.).

Malpighia ("fasc. i., ii.": not dated).—C. Avetta, 'Flora crittogamica della Provincia di Parma.'—C. Massalongo, 'Le Galle nell' *Anatome Plantarum* di Malpighi.'—L. Buscalioni & D. Casagrandi, *Saccharomytes guttulatus* (1 pl.).—E. Chiovenda, *Andropogon condylotrichus*.—L. Montemartini, *Polygonum Sieboldii*.

Nuov. Giorn. Bot. Ital. (April). — G. Fatta, 'Sui fiori di *Deherainia smaragdina*' (1 pl.).—C. Müller, 'Bryologia Provinciæ Schen-si' (cont.). — G. Pons, 'Rivista delle specie italiane del *Ranunculus*.'—C. Massalongo, *Ascidiota* & *Hariotella* (gen. nov. Hepaticarum: 1 pl.).

Oesterr. Bot. Zeitschrift (April). — A. v. Degen, 'Ueber einige orientalische Pflanzenarten.' — S. Murbeck, *Gentiana chrysoneura*, sp. n. (1 pl.).—O. Gelert, 'Die *Rubus*-Hybriden.'—J. v. Hasslinger, 'Variationem in den Blüten von *Papaver Rhœas*.' — (May). F. Buchenau, '*Luzula campestris* und vernandte Arten.'—K. Fritzsch, 'Zur Systematik der Gattung *Sorbus*.' — T. T. v. Heldreich, 'Excursion auf die Cykladen, 1897.'

BOOK-NOTES, NEWS, &c.

At the meeting of the Linnean Society on April 21st, Prof. Douglas Campbell communicated a paper, which was demonstrated by Mr. A. Gepp, F.L.S., "On the Structure of *Dendroceros*." The chief conclusions arrived at were as follows:—(1) In its apical growth and the form of the thallus, *Dendroceros* differs decidedly from other genera of the order Hepaticæ. The type of apical cell is that found in *Pellia epiphylla* and in the homosporous Ferns, especially *Osmunda*, where the prothallium resembles the thallus of *Dendroceros* also in the definite midrib and the occasional development of leaf-like lobes. (2) The archegonium corresponds in its structure to that of the other *Anthocerotaceæ*, and is intermediate in character between *Notothylas* and *Anthoceros*. (3) The antheridium is solitary, and arises, as in the others of the order, endogenously. (4) The first wall in the embryo is longitudinal, as in *Anthoceros*, but the first transverse wall determines the limits of the foot, as in *Notothylas*. (5) The origin of the archesporium is from the amphithecium, as in the other genera, but it is less massive than in either of these. (6) The division of the archesporial cells into sporogenous and sterile ones is less regular than in either of the other genera, and the primary archesporial cells may be transformed directly into sporogenous ones without any further division. (7) In *D. Breutelii* the spores remain undivided, but in *D. crispus* (?) they germinate within the capsule and are discharged as multicellular bodies. (8) Leitgeb's statement as to the absence of stomata from the capsule was confirmed.

At a meeting of the Linnean Society on May 5th, Miss Ethel Barton, by permission of the President and Council, read a paper "On the Structure and Development of *Soranthera*," a genus of brown Algæ (*Phæophyceæ*) containing a single species, *S. alvoidea*. The structure of the young plant consists of filaments radiating from the base, the cells at the surface bearing free assimilative filaments, like those in *Chordaria*. With the growth of the plant the internal structure is stretched and torn apart, leaving the centre empty. The assimilative filaments are shed, and the cells which bear them connect up to form a peripheral layer. Outgrowths which resemble plurilocular sporangia are associated with the assimilative filaments; and unilocular sporangia, together with paraphyses, surround crytostomata in the later stages of the plant. The systematic position of *Soranthera* remains at present uncertain, since different stages of its life-history correspond both with *Chordariaceæ* and *Encœliaceæ*. A main point of interest in *Soranthera* is its true parasitism on *Rhodomela Larix*. Rhizoids grow out from the base of the plant and penetrate the host.

We have received a "Catalogue of Plants growing in the Sedbergh District, including the Lune basin, from Middleton to Tebay," by Mr. John Handley (Leeds, Jackson: pp. 48). It seems carefully done, so far as it goes, but would have been the better for a more thorough reading of the proofs. There is no attempt to enumerate the forms of critical genera, with the exception of *Hieracium*. Several local names are given, and there is considerable evidence of personal observation.

The last part of the *Icones Plantarum* (April) is remarkable in that it is considerably taller and broader than any of its predecessors. The introduction of this change in size in the middle of a volume is on the face of it so exceedingly inconvenient that we can only suppose the editor (Dr. Dyer) has some very good reason for the alteration which does not appear on the surface. The text of the number, including the description of a new genus of *Euphorbiaceæ* (*Phyllanthodendron* = *Phyllanthus mirabilis* Muell. Arg.), is almost entirely by Mr. Hemsley, Messrs. Stapf, Burkill, and Bolus each contributing a species.

We are glad to see that, notwithstanding an amusing wail on the matter from the *Gardeners' Chronicle*, it has been decided to open Kew Gardens to the public at 10 a.m. Twenty years ago this Journal advocated the reasonableness of this concession, and we congratulate those who have continuously urged the matter upon the attention of the authorities upon the success of their agitation. It is to be hoped that the general Guide to the Gardens, which has been out of print for ten years or more, will not be much longer delayed.

THE awakening of the Kew *Bulletin* after its usual period of hybernation enables us to give a list of the dates of publication of the numbers which purport to have been issued in 1897, so far as dates are supplied by the Stationery Office stamp. Unfortunately even these cannot be altogether relied on; the number for December last and that for "January & February" are dated on the first page "3/98," but we believe they did not appear until May.

Date on wrapper and front page.	*Stationery Office date.*
January	January.
Feb. & March	August.
April	August.
May & June	September.
July	August.
Aug. & September	September.
October	September.
November	September.
December	March, 1898.

From this it appears that during the twelve months only one number has been published during the month which appears on both wrapper and first page as the date of publication! A further eccentricity is shown in the dates of the Appendices for 1898: the first of these bears the Stationery Office date "10/97," the second, "1/98." We note that *Punch* criticizes with some severity the statistics published in the *Bulletin*—"an official publication promulgated for the benefit of the few, not the many"—as to the number of visitors to the Gardens, and appeals to Dr. Dyer—"an acknowledged apostle of culture, especially Haughty-culture"—for an explanation.

PROF. SACCARDO'S *Sylloge Fungorum* has received an important addition in the first instalment (pp. 624) of an "Index universalis et locupletissimus nominum plantarum hospitum specierumque omnium fungorum has in colentum quæ usque ad finem 1897 excerpsit P. Sydow" (Berlin: Borntraeger).

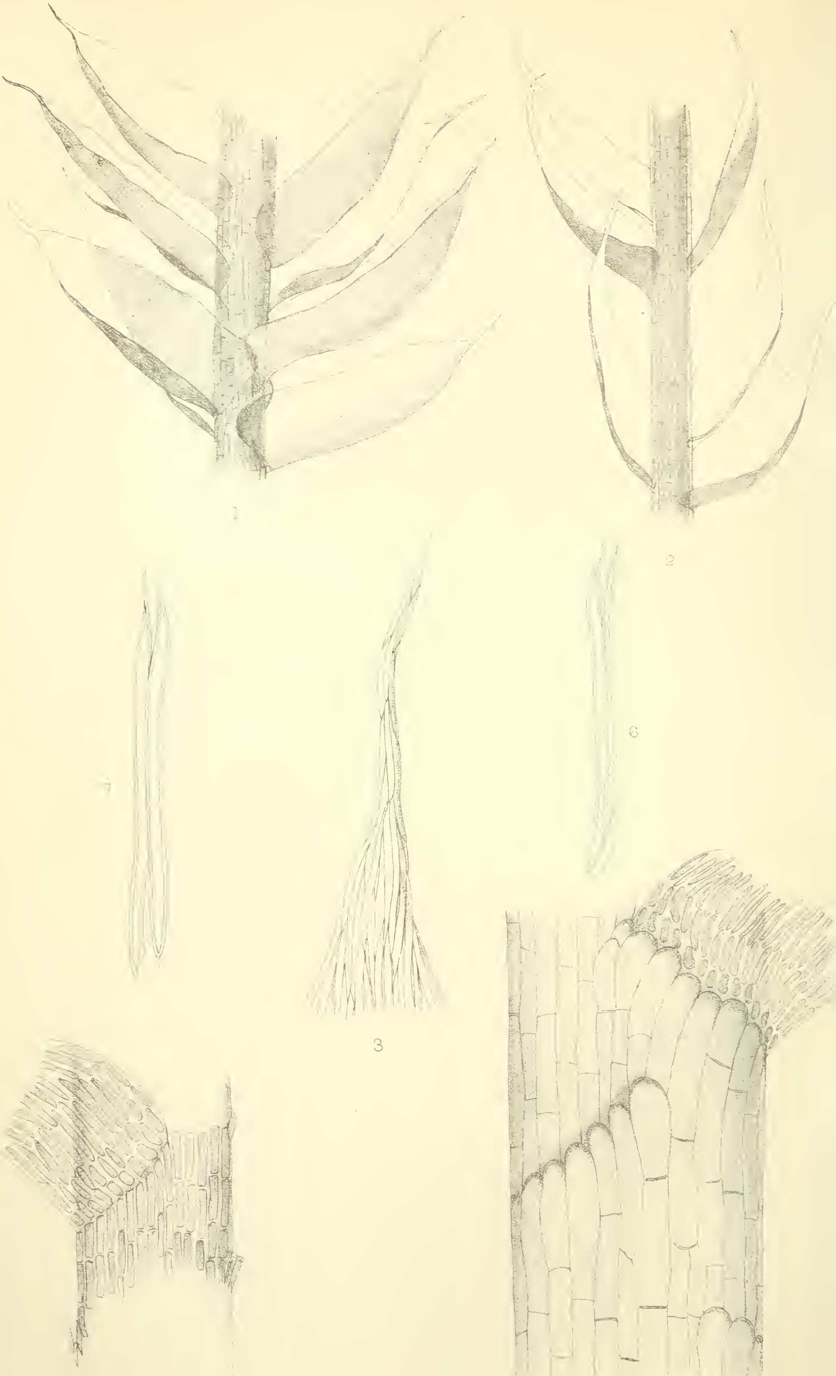
IN a paper on "A Study of the Phyto-Plankton of the Atlantic," read before the Royal Society on May 12, Messrs. George Murray and V. H. Blackman recorded their observations on a year's work in collecting phyto-plankton along a track from the Channel to Panama carried out by Captains Milner and Rudge, and also during one voyage to Brazil by Captain Tindall. They also gave the results of their own observations on living material at sea. The material was obtained by the pumping method. One of the objects of their work was to determine, if possible, the nature of the Coccospheres and Rhabdospheres. They describe the minute structure of the calcareous plates or coccoliths and rhabdoliths, and record the existence in the Coccospheres of a single central green chromatophore, separating into two on the division of the cell. They regard *Coccosphæraceæ* as a group of Unicellular Algæ, and they define the group, the limits of the genera and species. The Coccospheres and Rhabdospheres from the surface are compared with those of the deep-sea deposits and their identity established. They are also compared with geological coccoliths and rhabdoliths from various beds, and many objects regarded by geologists as true coccoliths and rhabdoliths are rejected. A large number of new *Peridiniaceæ* were discovered, and are formally described and figured. No specific diagnoses of marine *Peridiniaceæ* have previously been published, authors of species having depended on figures, and, at most, a few words of description. It is hoped that the present systematic treatment of the subject will conduce to greater order in the group. The authors record the occurrence of all the forms in seven tabular statements, one for each collecting voyage. Observations of the diatoms and *Cyanophyceæ* were also made, and are briefly treated. A study was also made of *Pyrocystis*, of which they describe a new species. The facts they record tend, in their opinion, to confirm the view originally expressed of it by Dr. John Murray, its describer, that it is an unicellular alga, although doubts have been entertained of the accuracy of this opinion by several biologists.

The London County Council has adopted a recommendation of the Parks Committee to the effect "that, as an experiment, and at a cost to the Technical Education Board, beds be planted in Battersea, Ravenscroft, and Victoria Parks with suitable specimen plants which could be utilized in the teaching of botany, and that a botanical guide be published. The object in view is to afford assistance to scholars in elementary and secondary schools in the study of practical botany." We await with interest and some trepidation the result of this experiment, especially the "botanical guide." It seems to us that the L. C. C. would be better employed in keeping its gardens—*e. g.* those on the Victoria Embankment, which have for many years been disgracefully neglected—in a state of efficiency; and the following paragraph, which we clip from the *Daily Chronicle* just as we go to press, shows that Hampstead Heath, which the Council have already spoilt by unsuitable planting, needs further protection:—"The hawthorn bushes on Hampstead and in Parliament-hill Fields is now in full bloom, and every day visitors, both adults and children, are seen carrying away large bunches of the "May" as souvenirs of their visit. Notices warning people against committing such depredations are fixed in many prominent positions, but these are totally ineffective unless some of the London County Council's officers are near at hand. There are, however, very few of these officials about, and these open spaces are very inadequately protected. For some reason, probably that of economy, the number of these officers on duty has been reduced by six, as compared with the number on duty at this time last year."

We are glad to see that Dr. Buchanan White's *Flora of Perthshire*, edited by Prof. Trail, has made its appearance. We hope to notice it in our next issue.

Mr. Arthur Lister and Mr. A. C. Seward have been elected Fellows of the Royal Society.

Errata.—In the last paragraph on p. 208, for "Perry" read "Penny." On p. 189, line 2 from top, for "cm." read "mm."



H. N. Dixon del.
R. Morgan lith.
West, Newman imp.

Plagiothecium Mullerianum *Schimp.*

PLAGIOTHECIUM MÜLLERIANUM Schimp. IN BRITAIN.

By H. N. Dixon, M.A., F.L.S.

(Plate 387.)

In July, 1897, I gathered a *Plagiothecium* on the side of Craig Chailleach, near Killin, Perthshire, which had somewhat the appearance of *P. pulchellum* var. *nitidulum* (Wahl.) Husn., but which I was unable to determine without closer examination than could be given at the time.

Shortly after returning home, and before I had found the opportunity of further studying this plant, I received from Mr. James Murray two fragments of a *Plagiothecium*, both evidently belonging to one and the same species, one labelled "*Plag. Müllerianum*, in rupium fissuris, Ben Wyvis, Aug. 1867, N. Sutherland & A. McKinlay"; the other unnamed, from Ben Narnain, Arrochar, 18 July, 1896, gathered by Mr. Murray himself. The general appearance of these plants was that of *P. Borrerianum* Spr., being fully as robust as that species in its ordinary form, but with a somewhat more rigid habit, and even more highly glossy and shining, the leaves complanate, of almost exactly the same form as in *P. Borrerianum*, somewhat abruptly ending in a moderately long, fine, perfectly entire acumen. On consulting the description of *P. Müllerianum* Schp. in the 2nd ed. of the *Synopsis*, I saw at once that it would not agree; such characters, for instance, as "minutulum, *Pl. pulchello* vix majus," "Folia . . . . elongato-lanceolata sensim in apiculum longum sub-piliformem attenuata," being quite inconsistent with the plants before me. Besides which, Schimper's note to the effect that it "differs from *P. pulchellum* in the longer, highly glossy leaves, complanately spreading, the dioicous inflorescence, the incurved, cylindraceous capsule and rostrate lid," certainly leads one to conclude that it practically only differs from the var. *nitidulum* of that species in the dioicous, not autoicous inflorescence.

I therefore referred the plants with some hesitation to *P. Borrerianum*. Mr. Murray concurred with my view as regards *P. Müllerianum*, but pointed out a very marked character in the large cortical cells of the stem, clearly separating the plants in question from *P. Borrerianum*, in which the cortical cells are narrow and obscure. The matter was left in this unsatisfactory position until on examining my plant from Killin, referred to above, I at once perceived that I had there the same species as the two plants *sub judice*. What was most marked in the Killin plant was the great variety in the size of the stems and leaves, varying from shoots as robust as in *P. Borrerianum* to the most slender, almost filiform flagellæ. The resemblance here to the *P. Müllerianum* of Schimper's *Synopsis* became at once apparent, and on comparison of my plant with authentic specimens in the

British Museum collection, its identity, as well as that of the two earlier Scotch specimens, was at once established beyond doubt.*

The addition of *P. Müllerianum* to our list of recognized British mosses is in itself of some interest, as the plant, a high alpine one, is rare upon the continent. It has, moreover, certainly been misunderstood hitherto; Kindberg, for instance, makes it a variety of *P. nitidulum* (= *P. pulchellum* var. *nitidulum*), an arrangement quite inconsistent with the actual facts; and I have received specimens, named *P. Müllerianum* on very good authority, from North America, which proved to be autoicous and to belong to *P. pulchellum*. And as most of the works accessible to the ordinary student give inadequate and even misleading descriptions of the species, I have thought a full description would not be without value.

As far as I am aware, *P. Müllerianum* has only twice been figured, by Husnot, in the *Muscologia Gallica* (Tab. c), and by Sullivant (Icon. Musc., Suppl., Tab. 66). The former does not give sufficient details to be of service in distinguishing the plant from the allied species, and the latter, while giving an excellent figure, is a scarce and highly expensive work, and one to which few students could obtain access. It has seemed desirable, therefore, to give a figure of the plant, which will, I believe, assist in rendering its identification fairly easy.

The only British species of *Plagiothecium* with which *P. Müllerianum* is liable to be confused are *P. Borrerianum* Spr.† and *P. pulchellum* var. *nitidulum* Husn. (The continental *P. piliferum* B. & S. is easily distinguished by the recurved leaf-margin, the longer subfiliform acumen, and enlarged cells at the basal angles.) *P. Borrerianum* usually grows in neater dense tufts, with very little variation (in the same tuft) in the size of the leaves or branches. The leaves are usually, though by no means always, decurved at the tips, principally at the apex of the branches, which then present a somewhat convex appearance from above. The acumen of the leaves is almost always, perhaps invariably, more or less denticulate. In *P. Müllerianum* the habit of growth is much more irregular and straggling, the branching irregular, and the branches themselves of very different degrees of robustness. Schimper describes the plant as minute, hardly larger than *P. nitidulum*, and most authors follow him in this comparison. Limpricht, for example, whose diagnosis is by far the fullest and most descriptive that I have seen, remarks of it: "not distinguishable from *P. pulchellum* in size." This statement, and the measurements which he gives—*e.g.* ·18 mm. for the thickness of the stem, which I have found as much as ·27 mm. in the Scotch plants—with the similar remarks of Schimper and other writers, show, I think, clearly that the more robust and without doubt typical form of the plant has rarely come under notice; the plant of most authors being the slender delicate form which often accompanies and sometimes replaces the typical growth. This comparatively robust plant, which resembles *P. Borrerianum* far more closely than it does *P. pulchellum*, may, however, be readily recognized by the more exactly complanate rigid expansion of the leaves, frequently pointing forward in a way very unusual in this genus (and reminding one of some species of *Fissidens*), so as to make an angle of about 22½° with the stem, instead of, as is usual, about 45°. The plant is remarkable, too, for the very highly polished shining leaves, much more markedly so than in *P. Borrerianum.* Under the microscope, moreover, they will be seen to be perfectly entire at the apex.

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* I subsequently ascertained that a specimen of *P. Müllerianum*, labelled "Ben Wyvis, Ross-shire, Aug. 1867, A. McKinlay," exists in Schimper's Herbarium at Kew; I have not examined it, but there can be no doubt that this is the same plant as that sent me by Mr. Murray, and that its identification as *P. Müllerianum* originally was by Schimper himself. It is remarkable that under these circumstances it should have remained so long without recognition as a British species.

† The subsequent remarks apply equally to *P. elegans* (Hook.), whether or not that is identical with *P. Borrerianum*.

It will be clear from what has been said, that in its typical form our species need not be confused with *P. pulchellum* var. *nitidulum* Husn., but in its slender states it so nearly resembles that plant that it is very difficult or even impossible to distinguish it with the eye or lens. It is therefore necessary to rely upon microscopical characters. (The type of *P. pulchellum* is at once distinguished by its small, secund, not complanate leaves.) In the first place *P. pulchellum* var. *nitidulum* is autoicous, while *P. Müllerianum* is dioicous. This, though evidently a character of importance in the genus, is by no means always easy to verify; for though in *P. pulchellum* and its var. the male flowers are usually readily to be found clustered about the base of the seta, still, being always at the lower part of the stem, they are frequently mixed up with earth and *débris*, and in old plants especially they may easily escape detection. In *P. Müllerianum*, however, the flowers on the female plants are in my experience much more numerous, and scattered along the whole length of the stem, instead of being, as is usually the case with the autoicous species, confined to a comparatively limited region towards the base of the stem and the point of origin of the principal branches. I have for instance counted twenty-eight perichætia on one stem of *P. Müllerianum*, taken at random, and less than an inch in length.

With the exception of the quite entire apex in *P. Müllerianum*, by which it may probably be confidently separated from *P. Borrerianum*, there is little in the leaf-character to distinguish it, on the one hand, from that species, and on the other, in its more slender forms, from *P. pulchellum* var. *nitidulum*, except the areolation. This is constantly, though slightly, narrower in our plant than in either of its allies; it exhibits, in fact, the narrowest cells of any British species of *Plagiothecium*. In *P. Borrerianum* the cells from the median part of the leaf average from 5 to 7 μ, in *P. pulchellum* and its variety from 5 to 8 μ, while in *P. Müllerianum* they vary from 3 to 5 μ, rarely, as far as I have observed, being found beyond the latter dimensions. (Limpricht, however, gives the measurement as 5–6 μ.)

But it is in the appearance and structure of the stem that the most salient characters are found by which *P. Müllerianum* may be distinguished with ease from the allied species. If a moderately robust branch of *P. Müllerianum* be laid side by side with branches of the two other species, and viewed under the microscope or with a lens, it is at once noticeable that the stem of the former is much stouter than in either of the two latter. The actual thickness of the normal stem in *P. pulchellum* var. *nitidulum* may be put at about 80–120 μ, attaining a maximum of 150 μ, that of *P. Borrerianum* being about the same. In *P. Müllerianum* an ordinarily robust stem ranges in thickness from 150 to 200 μ, frequently exceeding this, while it occasionally attains a thickness of 260 μ. (In slender forms of the plant, however, as in the flagelliform branches often produced, the thickness is much less.)

This marked difference in the thickness of the stem affords a character by which one accustomed to the plant could distinguish it, when typical, from the other two, even with a lens; but there is a still more important and constant character by which under the microscope it may be at once recognized even in its most attenuated forms: this is the structure of the stem tissue.

A transverse section of the stem of *P. pulchellum* shows a faint central strand, which is wanting in *P. Müllerianum*, and the cortical cells in the former species as well as in *P. Borrerianum* are narrow, with the walls slightly thickened, while in *P. Müllerianum* they are large, loose, and thin-walled. Limpricht italicizes the description of these "sphagnum-like" cortical cells as a distinguishing character, but makes no further reference to them; Sullivant, too, gives a figure of a transverse section of the stem showing them, but makes no mention of them whatever in his description; and neither author points out the fact that the character is easily observed without making a section of the stem, and is one by which *P. Müllerianum* may be at once separated from either of the two species with which it is likely to be confused.

If a stem of *P. pulchellum* or *P. Borrerianum*, partially denuded of leaves, be placed under the microscope, the cortical cells are seen to be narrow and obscure, measuring about 6–8 μ in width, thus being practically about the same width as the lower cells of the leaf, narrower indeed than the extreme basal cells at the line of insertion. In *P. Müllerianum*, on the other hand, the cortical cells range from about 14 μ in width to as much as 28 μ, averaging about 20 μ; thus measuring about four times the width of the lower leaf-cells, and two or three times the width of even the widest extreme basal cells. A reference to the plate (figs. 4, 5) will show more clearly than any description the ready character which this affords to distinguish *P. Müllerianum*.

In its fruiting characters *P. Müllerianum* appears to differ but little from *P. pulchellum*, though Limpricht points out one or two minor points of difference.

PLAGIOTHECIUM MÜLLERIANUM Schp. (Synopsis, ed. 1, 1860).*

Syn. *Plag. rostellatum* Mol. in Sched. 1861.
Hypnum Müllerianum Hook. fil., New Zealand Fl. (nomen solum), 1867.
Isopterygium Borreri Lindb. Notis. Sällsk. Faun. et Fl. fennica, 1874.
Plag. Molendoi Lorentz in Sched.
Isopterygium Müllerianum Lindb. in Meddel. Soc. Faun. et Fl. fennica, 1887.

Type in Schimper's Herbarium at Kew.

In loose irregular tufts or patches, pale bright or yellowish green, *highly glossy.* Stems short, prostrate and often rooting at intervals, irregularly branched in a complanate manner. Branches 5–15 mm. long, moderately robust and resembling those of *P. Borrerianum*, or more frequently slender and similar to those of *P. pulchellum* var. *nitidulum;* often producing numerous extremely slender small-leaved flagelliform shoots. Stems *stout*, 150–220 μ or more in thickness, without a distinct central strand; *cortical cells large, lax, thin-walled*, usually 16–22 μ in width.

Leaves rather close, *exactly and rigidly complanate*, so as to appear distichous, usually less widely divergent from the stem than in the allied species; from a somewhat narrowed *not decurrent* base ovate-lanceolate, concave, gradually narrowed upwards and then somewhat rapidly long apiculate (in the more slender forms the leaves are narrower, and much more gradually tapering to a fine acumen); margin plane, *quite entire;* nerve double, extremely faint and short. Cells *very narrow*, about thirty times as long as broad (80–100 μ × 3–5 μ), very little wider towards base and *not distinctly enlarged at angles;* at insertion a few very short, irregularly elliptical.

Dioicous. Male plant with the perigonia small, scattered along the stem. Fertile plant with the perichætia very numerous along the stem and principal branches. Paraphyses numerous, long (in *P. pulchellum* few and short). Capsule almost erect, or inclined, lid shortly and bluntly rostellate. Fruit ripe in late summer.

Hab. On the ground, stones, and tree-roots in sheltered spots on mountains. Ben Wyvis, 1867 (*Sutherland & McKinlay*); Ben Narnain, Arrochar, 1896 (*Murray*); Craig Chailleach, near Killin, 1897 (*Dixon*). All female plants, sterile.

The locality in which I gathered the plant in 1897 was on the shady bank of a deep ravine by a mountain stream on the side of Craig Chailleach, not far from Lochay Bridge, at an unusually low altitude for the species (the range of which is given by Limpricht as from 2000 to 5500 ft.), being only about 1000 ft. It was, however, growing in company with one or two other alpine species, viz. *Cynodontium virens* and *Hypnum hamulosum.*

P. Müllerianum has been recorded from a considerable number of localities in the Alps, and also from the Pyrenees, Caucasus,

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* I have taken the synonymy from Limpricht (*Laubmoose*).

South Norway, and North America. Limpricht cites some half-dozen localities in which the fruit has been found.

Explanation of Plate 387.—Fig. 1. Portion of stem, × 25. 2. Ditto, from slender plant, × 25. 3. Apex of leaf, × 135. 4. Portion of stem with most of the leaves removed, × 135. 5. Ditto, of *P. pulchellum* var. *nitidulum*, × 135. 6. Cells from upper third of leaf, × 225. 7. Ditto, of *P. pulchellum* var. *nitidulum*, × 225. (Figs. 1, 3, 4, 6. Ben Narnain, *J. Murray*. Fig. 2. Craig Chailleach, *H. N. Dixon*.)

NOTES ON CAMBRIDGESHIRE PLANTS.

By W. West, Jun., B.A.

These notes are the result of observations made while in residence at Cambridge during 1892–6. Since the appearance of Prof. Babington's *Flora of Cambridgeshire* in 1860, much investigation on the distribution of plants in the county has been carried out; but, apart from Mr. Fryer's extensive researches into *Potamogeton*, the published records have in the main been isolated ones. The *Flora*, in the compilation of which the Rev. W. W. Newbould had so large a share, is a most exhaustive catalogue. This is especially true of the southern half of the county, where new stations are seldom discovered. The late Professor kept an annotated copy of the *Flora*, which, up to the time of his death, was placed (along with the original MS. of the *Flora*) in the University Herbarium. It was carefully posted up, certainly to 1885, and I believe till a later date. On a recent visit I found that (along with the MS.) it had been removed. The matter is mentioned here because I wish to point out that the records contained in the annotated copy must be carefully examined with a view to inclusion in any future *Flora* of the county. Some of them are now obtainable from no other source; but the more noteworthy ones were accompanied by specimens which can be seen in the Herbarium at Cambridge. These include such interesting Cambridgeshire plants as *Lactuca saligna*, *Veronica spicata*, *Teucrium Scordium*, &c.

That the flora of Cambridgeshire is so interesting is due almost as much to the absence or rarity of many common plants as to the occurrence therein of so many rare species. *Digitalis purpurea* and *Lathyrus montanus* are absent from the county, as are *Chrysosplenium oppositifolium*, *Vaccinium Myrtillus*, *Viola palustris*, *Neckeria claviculata*, *Scirpus sylvaticus*, &c.

The following are markedly rare in the county; indeed, it is doubtful whether the first five still occur:—*Gnaphalium sylvaticum*, *Erica cinerea*, *E. Tetralix*, *Juncus squarrosus*, and *Lomaria Spicant*; *Sisymbrium Thalianum*, *Montia fontana*, *Lychnis dioica*, *Hypericum humifusum*, *H. pulchrum*, *Oxalis Acetosella*, *Ilex Aquifolium*, *Trifolium medium*, *Alchemilla vulgaris*, *Rubus Idæus*, *Drosera rotundifolia*, *Adoxa Moschatellina*, *Galium saxatile*, *Asperula odorata*, *Valerianella olitoria*, *Solidago Virgaurea*, *Myosotis versicolor*, *Pedicularis sylvatica*, *Melampyrum pratense*, *Stachys arvensis*, *Teucrium Scorodonia*, *Allium ursinum*, *Luzula vernalis*, *Scirpus cæspitosus*, *S. setaceus*, *Carex pulicaris*, *C. echinata*, *C. ovalis*, *C. pilulifera*, *C. pallescens*, *C. vesicaria*, *Milium effusum*, *Holcus mollis*, *Deschampsia flexuosa*, *Aira caryophyllea*, *Sieglingia decumbens*, *Melica uniflora*, *Nardus stricta*, *Athyrium Filix-fœmina*, *Lastræa dilatata*, *Equisetum maximum*, and many others.

A very unpleasant feature in the Cambridgeshire flora is the large number of extinctions. Except Middlesex, I know of no county in which so many are to be recorded. In the following list there are doubtless included some species which will be re-discovered, but the majority are only too surely extinct; and the probability is that it will be augmented by several of the Gamlingay plants mentioned below:—

Sisymbrium Irio.
Lepidium latifolium.
Frankænia lævis.
Ulex nanus.
Vicia sylvatica.
Lathyrus Nissolia.
Prunus Cerasus.
Pyrus torminalis.
Sedum Telephium.
Drosera intermedia.
D. anglica.
Cicuta virosa.
Caucalis latifolia.
Senecio palustris.
Hieracium murorum.
H. umbellatum.
Sonchus palustris.
Schollera Oxycoccus.
Lysimachia nemorum.
Centunculus minimus.
Mentha rotundifolia.
M. Pulegium.
Littorella juncea.
Chenopodium urbicum.
Beta maritima.
Atriplex pedunculata.
Myrica Gale.
Ophrys aranifera.
Malaxis paludosa.
Fritillaria Meleagris.
Ornithogalum pyrenaicum.
Allium oleraceum.
Colchicum autumnale.
Ruppia rostellata.
Rynchospora alba.
Carex dioica.
C. teretiuscula.
C. axillaris.
C. curta.
C. strigosa.
Setaria viridis.
Phleum arenarium.
Festuca rottbœllioides.
Polystichum lobatum.
Lastræa Oreopteris.
Equisetum sylvaticum.
E. hyemale.
Lycopodium inundatum.
L. clavatum.

Hall Wood, Wood Ditton, had ceased to be a wood at the time the *Flora* appeared, the site being under cultivation. It was the only Cambridgeshire locality for *Vicia sylvatica*, *Carex strigosa*, *C. axillaris*, and *Lysimachia nemorum*. I hesitate to call the latter an extinction, but it has not yet been recorded from any other stations, though careful search has been made.

At Gamlingay, in the extreme west of the county, and on the Lower Greensand, there was formerly an extensive heath containing some very productive bogs. In 1860 the bogs had been drained, and the greater part of the heath enclosed. Now the bog-plants have entirely disappeared, and there is none of the original open heath left. Of those plants which are unknown elsewhere in the county *Solidago Virgaurea* and *Trifolium subterraneum* still occur in some quantity by the roadsides about the site of the former heath; but recent search for *Teesdalia nudicaulis*, *Cerastium quaternellum*, *Hypericum humifusum*, *Trifolium filiforme*, *Peplis Portula*, *Gnaphalium sylvaticum*, and for *Hypericum elodes*, *Erica cinerea*, *E. Tetralix*, *Narthecium Ossifragum*, *Juncus squarrosus*, and *Lomaria Spicant* has been unavailing. It is probable that the last six species at least are extinct in Cambridgeshire. *Hypericum pulchrum*, *Ornithopus perpusillus*, *Calluna Erica*, and *Potentilla argentea*, which have been found, though very rarely, elsewhere in the county, still occur at Gamlingay; but it is improbable that *Drosera rotundifolia*, *Genista anglica*, and *Potentilla palustris* can now do so.

In the *Flora* many new species are recorded from "the Common at one mile from Cambridge towards London." This locality has been greatly altered, the former bog having entirely disappeared, and the Common being reduced to a small patch of ordinary pasture land. All the plants recorded from here have disappeared, save *Sagina nodosa* (1895, very sparingly, *A. Shrubbs*) and *Trifolium fragiferum*. *Stellaria uliginosa* (very local in the county) still occurs on the adjoining Sheep's Green, and the submerged form of *Hippuris vulgaris* occurs in the conduit by the Trumpington Road.

The paucity of Rubi and (as regards numbers) of Carices is worthy of note. Throughout the whole of the southern half, at any rate, the most ordinary sedges are seldom met with; and the rarity of *C. Pseudo-cyperus* and *C. vesicaria* in such a county is as inexplicable as is that of *Cardamine amara*.

In addition to those cases mentioned in the general list, I know of no recent record for the following (among others), and several of them are no doubt extinct:—

Rœmeria hybrida.
Radiola linoides.
Geraninm columbinum.
Galium anglicum.
Pulicaria vulgaris.
Anthemis nobilis.
Antennaria dioica.
Arnoseris pusilla.
Hypochœris glabra.
Lactuca virosa.
Crepis fœtida.
Hieracium boreale.
Jasione montana.
Antirrhinum Orontium.
Ajuga Chamæpitys.
Herniaria glabra.
Chenopodium murale.
Polygonum Bistorta.
Herminium Monorchis.
Luzula maxima.
Apera Spica-Venti.
A. interrupta.
Holcus mollis.
Glyceria distans.
Lastræa spinulosa.
Athyrium Filix-fœmina.
Botrychium Lunaria.

Geranium columbinum had no real claim to a place in the *Flora;* it was found once only, and then as a casual. *Ajuga Chamæpitys* and *Antirrhinum Orontium* may still occur about Odsey, but if the former does so, it is probably on the Hertford side of the boundary.

My friend Mr. I. H. Burkill, M.A., of Caius College, very kindly sent me a list of records for inclusion in this paper. Some of them (e.g. *Geranium rotundifolium* and *Utricularia minor*) were of great interest. I gratefully thank Mr. Arthur Bennett for much help rendered to me in connection with this paper and with British Botany generally. Mr. Arthur Shrubbs at the University Herbarium kindly gave me information about many Cambridge plants.

In the following list any record rests on my personal observation unless otherwise stated. The numbers are those of the districts of the county as defined in the *Flora;* an asterisk denotes that the species was not recorded from that district. Records for very many common plants are still wanted for the most northern district (8, Wisbech); as it is almost entirely fen-land, the ordinary woodland species are no doubt really absent.

Thalictrum collinum Wallr. (*T. saxatile* Bab. Fl. Cambs. p. 1). 1. Fleam Dyke. Several places W. of the Devil's Ditch on Newmarket Heath; Beacon Course, &c. — *T. flavum* L. 7. Ditches by road, Chatteris to Mepal.

Anemone Pulsatilla L. 1. Fleam Dyke, plentiful. Much more plentiful on that section of the Devil's Ditch included in this district than on that in Dist. 5, where it occurs in limited quantity.

Ranunculus circinatus Sibth. 5. Baitsbite. — *R. trichophyllus* Chaix. 2. Dernford Fen. — *R. Drouetii* Godr. 3. Grantchester Meadows.—*R. heterophyllus* Web. ex. p. 4. Milton.—*R. Lingua* L. 5. Ditch between Burwell and Wicken Fen, 1893. — *R. parviflorus* L. 3. Still at Gamlingay in 1895; not recorded thence since Relhan.

Aquilegia vulgaris L. 3. Edge of fallow above Harlton chalk-pit, probably adventitious. 5. Chippenham Fen, plentiful and apparently indigenous. Babington distrusted this as a native in the recorded stations.

Delphinium Ajacis Reichb. 2. One plant in a cornfield between Sawston and Dernford Fen; the late J. E. Gray (of King's College). This, which was formerly so plentiful, is now very rarely found. It still occurs near Swaffham Prior (5), where *Rœmeria hybrida* DC. has not been seen for many years.

Castalia speciosa Salisb. 5. Chippenham Fen.

Fumaria densiflora DC. 5.* Mr. G. C. Druce and myself found this in fields between Fordham and Chippenham Fen in 1893.—*F. Vaillantii* Loisel. 1. Still in the old locality near the entrance to the Wool-street; I did not see it elsewhere on the Gogmagogs. —*F. parviflora* Lam. 1. By the Fleam Dyke near the old railway, very fine. 5. Cornfields S.E. of Chippenham Fen.

Nasturtium palustre DC. 1.* Coe Fen, Cambridge.

Arabis hirsuta Scop. 5. Plentiful on the black soil of a "drove" between Burwell and Wicken Fen.

Cardamine amara L., which is recorded in Top. Bot. ed. 2, but not in the *Flora*, was found some years ago in very small quantity close to the railway bridge over the Cam at Barnwell. Recent search there has been in vain. The rarity of this plant in the county is quite extraordinary; it is common in the fenland of W. Suffolk, by the R. Lark.

Cochlearia Armoracia L. 1. Flowering abundantly in an old chalk-pit at Linton, 1895. 3.* Gamlingay to White Wood, in flower, May, 1895.

Sisymbrium Sophia L. 2. Between Dernford Mill and the Sawston Road, 1895. 3. By the Barton Road at 1¼ miles from Cambridge. Waste ground near the C. U. bathing-sheds. 4. Opposite Upware; near Milton. 5. Bottisham Lode, 1892; *I. H. Burkill.* 6. Above Roswell Pits, Ely.

Diplotaxis muralis DC. 1. Still in the original locality at the Wort's Causeway gravel-pits. It now occurs in several places about Cambridge and Ely and towards Newmarket, but is not nearly so general as it is further south.

Lepidium Draba L. 5.* By White Hall, near Ditton, 1894; *I. H. Burkill.*

Thlaspi arvense L. 1.* Abington Park; *A. H. Evans.* 2.* Railway embankment, Dernford Fen, 1896; *I. H. Burkill.* These are the only records since Relhan's time. The species is curiously rare in the county, and then more of a casual than a colonist.

Dianthus deltoides L. occurs on both furze-hills at Hildersham (1).

Saponaria officinalis L. 5. Fordham village; *I. H. Burkill.*

Silene anglica L. A very curious mistake occurred in printing the *Flora*, by which the localities for *S. Otites* appeared under this species, and *S. Otites* was omitted altogether. Babington's own locality for *S. anglica* was "5. To the east of Chippenham" (Spn. in Herb. Bab. from Chippenham, Cambs., 29 July, 1852).—*S. Otites* Wibel. 5. Plentiful at the Chippenham gravel-pit, 1894–6; and close to the county boundary between Fordham and Freckenham, 1896. — *S. noctiflora* L. 1. By Borley Wood. 3. By the Barton Road.

Lychnis dioica L. In the *Flora* this is said to be absent from the county. It may be so now, but in the University Herb. I have seen a record of its occurrence close to the Herts and Essex borders about thirty years ago (doubtless that referred to in Top. Bot. ed. 2, p. 67; and in Gibson's *Flora of Essex*, p. 46). The absence of this plant and of *Melica uniflora* Retz. and *Oxalis Acetosella* L. from the W. Cambs. woods is remarkable.

Stellaria aquatica Scop. 2. Dernford Fen, near the railway. 3. Near the bridge, Harston. — *S. Holostea* L. 1. Lane below "The Rivey," Linton. 4.* Madingley Wood, S.W. corner.—*S. palustris* Retz. 4.* Ditch E. of Waterbeach Station, towards the river.

Arenaria tenuifolia L. 2. Wall at Sawston; the var. *laxa* (Jord.).—*A. trinervia* L. 2. Sparingly by the railway in Dernford Fen. 3. Lane between Trumpington Church and the river, near the bridge. A rare plant in Cambs.

Sagina apetala L. 3. On the churchyard wall, Coton, 1896.—*S. nodosa* Fenzl. 2. Dernford Fen, W. of the railway. 7. Pastures immediately S.E. of the bridge at Horseway.

Mr. Burkill informs me that the *Lepigonum medium* of the *Flora* (p. 85) is probably *Buda marina* Dum. var. *neglecta* (Kindb.).

Hypericum elodes L. grew until recently by the stream near the site of the old bog at Gamlingay (3), but I could not find it in 1894.

Linum perenne L. 1. Fleam Dyke. On the Gogmagogs, the earliest flowers open about April 28th in an ordinary year.

Geranium pratense L. 5. Roadside near Barnwell towards Fen Ditton, sparingly, 1895. Very local in Cambs. — *G. pyrenaicum* Burm. fil. 1. Hedges and borders of a plantation near Dungate Farm, Fleam Dyke, 1895.— *G. rotundifolium* L. 3. Roadside near Selwyn College, Cambridge, 1896; *I. H. Burkill.* Not recorded for the county since 1820. Surely casual in this station?

Rhamnus catharticus L. 2. Dernford Fen, very sparingly. 5. Hedges a little W. of Quy Fen.—*R. Frangula* L. 5.* Wicken Fen, abundant.

Genista tinctoria L. 3. Hedge-bank and copse by the Old North Road, ½ mile S. of the station, 1895.

Sarothamnus scoparius Koch. 5. Kennet Heath. 6.* Between Ely and Burnt Fen. Very local in this county.

Medicago sylvestris Fr., *M. falcata* L., and *M. minima* Desv. still occur at Chippenham (5).

Trifolium ochroleucum Huds. 1. Babington italicizes Hinton, Ray's locality for the plant. It was plentiful in one corner of the pasture by the Cambridge foot-path opposite Hinton Church in 1894, but I could not find it in the following year. Furze Hills, Hildersham. 3. Fallows S. of the St. Neot's Road at 3½ miles from Cambridge, with *Allium vineale* L.; by Hardwick Wood. 5. Rail-bank 1¼ miles from Fordham towards Soham. — *T. fragiferum* L. 1. Road between Brinkley and Dullingham. 4. St. Neot's Road, from 1 mile from Cambridge onwards. 5. Stourbridge Fair Green; by the Quy Road; road between Fen Ditton and Horningsey; Baitsbite; S.E. end of Burwell Lode. 6. Above Roswell Pits, Ely. — *T. filiforme* L. 7.* Horseway, Chatteris; see *Memorials, Journal, and Botanical Correspondence of C. C. Babington*, p. 388.

Lotus tenuis Waldst. & Kit. 3. Plentiful in fallows S. of the St. Neot's Road at 3½ miles from Cambridge; it was much infested with *Cuscuta Trifolii* Bab.

Lathyrus Aphaca L. has disappeared from all its localities near Cambridge.

Vicia hirsuta Gray. 1. Borley Wood. Very local in Cambs.— *V. sepium* L. 2.* Sawston Moor. 3. Gamlingay Wood.

Spiræa Filipendula L. 2. Sawston Moor. 4. Sparingly in a pasture at King's Hedges.

Geum rivale L. 2.* Sparingly at the N. end of Dernford Fen, 1895; discovered here by Mr. Shrubbs.

Potentilla verna L. 1. Still occurs over a very limited area on the Wool-street; the growth of the trees has destroyed it in the plantation itself.

Poterium officinale Hook. f. 3. Lane between the Old North Road and Kingston Wood.

Rosa rubiginosa L. 1. Fleam Dyke, near the old railway.

Saxifraga granulata L. 2.* Dernford Fen, plentiful; found by Mr. Shrubbs.

Parnassia palustris L. has not been recorded from Dernford Fen (Newbould's "Sawston Moor") nor from elsewhere in the county for forty years. It is probably extinct on Shelford Common and Foulmire Moor and at Triplow. It may still exist in the rough pastures about Quy and Teversham, but, if so, has eluded vigilant search.

Drosera rotundifolia L. is now extinct in the localities recorded in the *Flora*, but Mr. Shrubbs informs me it grows in Chippenham Fen (5*).

Myriophyllum verticillatum L. var. *pectinatum* DC. 4. Ditch between Milton and the river.—*M. spicatum* L. 5. Wicken Fen.

Lythrum Hyssopifolia L. is probably extinct in all its recorded localities in Districts 1 and 4.

Bupleurum tenuissimum L. was plentiful and very fine on Watergull Hill, Sutton (6), in Aug. 1895 (see Journ. Bot. 1884, 28).

Sium latifolium L. 4. Plentiful at intervals in ditches by the railway about 1½ miles S.E. of Stretham to within a mile of Waterbeach. 7. Sparingly near Vermuyden's Drain at Horseway.

Fœniculum vulgare Mill. 1. Entrance to great chalk-pit, Hinton (1892); escape.

Œnanthe fistulosa L. 7. Horseway; Old Bedford Barrier Bank, near Sutton Gault. — *Œ. Phellandrium* Lam. 2.* Stream S. of Shelford Station. 7. Horseway; "Washes," and by and in the Old Bedford River,

Silaus flavescens Bernh. 2.* Dernford Fen, on both sides of the railway.

Selinum Carvifolia L. is fairly plentiful at its locality in Dist. 5. I merely mention it because from the account in the *Report of the Botanical Locality Record Club* it would appear that the plant occurred in quantity in several localities over a considerable area.

Caucalis daucoides L. 3. Fields by the Old North Road, 1 mile S. of the station. — *C. arvensis* Huds. 3.* Field a little S.W. of Grantchester.

Adoxa Moschatellina L. is still plentiful in the lane at the E. end of Chesterton (4), but it does not seem to spread. A remarkable absentee from the wooded districts of Cambs.

Viburnum Opulus L. 4. Moor Barns. 5.* Wicken Sedge Fen; *I. H. Burkill.*

Galium Cruciata Scop. 3. Hedge-bank near Lord's Bridge.

Asperula odorata L. Confirmation of the occurrence of this species in the county is much to be desired. There is no specimen from Gamlingay Wood in Babington's Herbarium. Hall Wood, Wood Ditton, was destroyed before the *Flora* appeared, and at Fulbourn and Kingston the plant does not seem to have been found since Relhan's time.

Dipsacus sylvestris Huds. 5. By Spinny Bank, and at Upware. —*D. pilosus* L. 1. Wood at Hildersham; *I. H. Burkill.* 5. Plentiful at Upware, by the road to Wicken.

Scabiosa Succisa L. 5. Plentiful in Wicken and Chippenham Fens.

Erigeron canadense L. 4.* With *Onopordon Acanthium* L. on waste ground at Chesterton, 1894–5.—*E. acre* L. 1. Abundant on the banks of the railway between Dullingham Station and the Devil's Ditch; shown me by Mr. I. H. Burkill. 2. W. of the line on Sawston Moor, 1895, plentiful. 5. Open sandy ground adjoining Fordham Station; gravel-pit at Chippenham.

Filago spathulata Presl. 3. With *F. apiculata* G. E. Sm. at Gamlingay.

Achillea Ptarmica L. 7. Sparingly by Vermuyden's Drain, near the bridge at Horseway. Very local in Cambs.

Anthemis tinctoria L. 3.* A few plants by the footpath near Gamlingay Wood.—*A. arvensis* L. 1. Mr. S. Wood and myself noted this in fields on the E. of the Fleam Dyke, near the deserted railway.

Chrysanthemum segetum L. 4. Chesterton; towing-path near railway bridge, Cambridge, one plant, 1893; *I. H. Burkill.* 6. Near two windmills to the W. of Ely.

Artemisia Absinthium L. 1. The Hinton locality is italicized in the *Flora*. I have seen it in the large chalk-pit there, where Mr. I. H. Burkill found it.

Petasites fragrans Presl. 1.* Banks of ditch by road to Hinton, ½ mile from the village. 4.* Madingley Road; *I. H. Burkill* (see Journ. Bot. 1893, p. 309).

Senecio viscosus L. 4.* Waste ground at Chesterton, 1894. The only recent record, but no doubt casual here (see Journ. Bot. 1883, pp. 346–7).

Cnicus eriophorus Roth. 3. Lane between Old North Road and Kingston Wood.—*C. pratensis* Willd. 5. Chippenham Fen.

Onopordon Acanthium L. 1. Roadside near entrance to Woolstreet. 4. In quantity on railway embankment near Waterbeach Station, 1896; *I. H. Burkill.* Chesterton. 5.* N. side of road to Quy; near Wicken, 1896; *I. H. Burkill.*

Serratula tinctoria L. 5.* Mr. S. Wood and myself found this to be abundant in Chippenham Fen.

Centaurea Cyanus L. 1. Coe Fen, 1895. 3. Waste ground opposite New Court of Trinity College, 1895.

Picris echioides L. 1. Borley Wood.

Hypochæris maculata L. 1. Occurred very sparingly on the Hildersham Furze Hills in 1895. Probably extinct on Littletrees Hill, Gogmagogs.

Leontodon hirtus L. 1. Field S. of road to Quy.

Lactuca Scariola L. I was unable to find this at the station recorded in Dist. 1.—*L. saligna* L. still occurs in Dist. 7, at about twenty miles from any tidal waters.

Campanula Trachelium L. 3. Thickets and hedges by and near the Old North Road at up to a mile from the station.—*C. rapunculoides* L. 1. On a gravelly roadside near West Road, Cambridge. 4. Near the extreme N. end of Middlehill Drove, nearly opposite Upware. Doubtless escapes.

Hypopitys Monotropa Crantz. 3. In fair quantity in a plantation by the St. Neot's Road at 3½ miles from Cambridge; first found by Prof. Cowell.

Primula acaulis L. 1. Pasture near Fulbourn Station. 3. Whitwell Wood, and in the locality just given for *Hypopitys.*—*P. elatior* Jacq. 3. Gamlingay Wood, fruiting freely. Still plentiful between Long Stow and Bourn and in most of the woods in the W. and S.E. of the county, where it quite replaces *P. acaulis* L.

Lysimachia vulgaris L. 5. Burwell Fen; *I. H. Burkill.* 7. Ditches by road, Chatteris to Mepal. — *L. Nummularia* L. 1. Coe Fen, Cambridge; ditch by road to Hinton. 3. Hayley Wood, abundant. 7. Horseway, near Chatteris. This species seems to have taken the place of *L. nemorum* L. in the woods in W. Cambs.

Anagallis tenella L. 2. Still on Sawston Moor; extinct in the other localities in Districts 1 and 2. 5. Wicken Poors' Fen; *I. H. Burkill.* Chippenham Fen, sparingly, 1895.

Samolus Valerandi L. 5. Chippenham Fen, with *Menyanthes trifoliata* L. 6. Roswell Pits, Ely.

Limnanthemum peltatum S. P. Gmel. is much more widely distributed in Districts 6 and 7 than would appear from the *Flora.* It is very fine in the wash at the foot of the Old Bedford Barrier Bank, S.W. of Mepal.

Symphytum tauricum Willd. is now well established in several places near Cambridge. 1. Coe Fen, 1890; *A. H. Whipple.* 3. Barton Road, 1890, and Grantchester, 1891; *I. H. Burkill.*

Borago officinalis L. 4. St. Neot's Road near foot of Madingley Rise, one plant, 1894.

Lithospermum officinale L. 6.* Roswell Pits, Ely, very local, 1895.

Cuscuta Epithymum Murr. I am afraid that the reclamation of the heath has destroyed this at Gamlingay (3). It should be looked for on Kennet Heath (5), the only suitable locality now left in Cambs.— *C. Trifolii* Bab. 1. On *Lotus* in chalk-pit on Little-trees Hill. 2. Clover-field W. of Dernford Fen. 4. Madingley chalk-pit, on *Galium verum*, *Peucedanum sativum*, &c.

Solanum nigrum L. 5. By the lake, Quy Hall, 1896; *I. H. Burkill.*

Atropa Belladonna L. 1. Wood by Pampisford Hall, 1893; *I. H. Burkill.*

Hyoscyamus niger L. cannot now be said to be "not unfrequent by roadsides, but of uncertain locality" in Districts 1–4. Admitting the latter qualification, it is rarely found nowadays. In the S. of the county I have only seen it in Coe Fen, Cambridge (1), on waste ground in 1895; and by the Devil's Ditch near Cambridge Gap (5), where Mr. I. H. Burkill found it in 1895.

Verbascum Thapsus L. 2. Gravel-pit near Whittlesford Station. 3. Fallow near Kingston Wood. — *V. nigrum* L. 5. Plentiful on the rail-banks near Kennet Station; also between Kennet and Chippenham, and between Chippenham and the Fen.

Linaria Elatina Mill. 1. With *L. spuria* Mill. by Borley Wood. —*L. viscida* Moench. 5. Railway between Soham and Fordham; *I. H. Burkill.*

Veronica spicata L. 1. Recent search for this in its old station on Newmarket Heath has been fruitless. The character of the

Beacon Course has changed somewhat, it having become grass-grown in many parts where firm turf was previously found. The last published record is that in Top. Bot. ii.—"Ar. Bennett, 1876." About twenty years ago it was discovered (I think by Mr. R. B. Smart) in another station some miles away. This was in the vicinity of the Fleam Dyke, and, from the nature of the surrounding country, a rather inaccessible locality. Examination of the ground in 1894-5 forced me to the belief that extension of cultivation must have destroyed the habitat. I know nothing concerning the Top. Bot. (Wardale's) Norfolk record; but the plant still occurs in W. Suffolk, where I saw it in 1895.—*V. scutellata* L. 1. Between Babraham and Stapleford, 1890; and 5. Quy Hall, by the lake, 1896; *I. H. Burkill.*—*V. Tournefortii* C. Gmel. 3. Grantchester. 4.* Moor Barns, abundant.

Melampyrum cristatum L. 1. Covered acres in Borley Wood, 1894. 3. Frequent in copses and hedgerows about the Old North Road near Kingston Wood, in thickets about Caldecot near Hardwick Wood, &c.; like *Primula elatior* Jacq., it is characteristic of the wooded tracts on the boulder clay in the W. and S.E.—*M. pratense* L. is quite replaced by the more showy species. There is no specimen in Herb. Bab. from White Wood, Gamlingay, from which Prof. Henslow and Mr. Wanton recorded it; and it seems to be extinct in both of Ray's localities.

Orobanche major L. has not been seen in the county for many years. The complete reclamation of Gamlingay Heath has probably destroyed it in that station.—*O. elatior* Sutt. 1. Mr. I. H. Burkill showed it to me on the rail-banks E. of Dullingham; Furze Hills, Hildersham. 5.* Devil's Ditch near Reche, 1893.—*O. minor* Sm. 5. Dry ground, edge of Chippenham Fen.

Utricularia vulgaris L. 5. Chippenham Fen.—*U. minor* L. 5. Wicken Poors' Fen; *I. H. Burkill.*

Pinguicula vulgaris L. 2. Still on Sawston Moor; *A. Shrubbs.* 5. Chippenham Fen, sparingly, 1893. Now gone from the other localities, except perhaps Bottisham Fen.

Verbena officinalis L. 1. By the Fleam Dyke. 2. Hauxton; Sawston Moor. 3. Lane between Trumpington and the river; Harston. 4. Near King's Hedges.

Nepeta Cataria L. 1. Roadside between Shelford and Trumpington, 1895. Little-trees Hill and other places on the Gogmagogs. Roadside near Six-mile-bottom Station, and a mile S. near Lark's Hall. 2. Sawston Moor; and roadside near Sawston; *I. H. Burkill.* 4. Lane W. of Milton. 5. Plentiful by the Newmarket Road between Barnwell and Quy; by the Thetford Road within two miles of Newmarket. This is rather frequent in S.E. and E. Cambs.

Stachys Betonica Benth. 1. Borley Wood. Local in Cambs, and unrecorded from the northern half of the county.

Lamium maculatum L. 3.* Near Newnham in 1891, now destroyed; *I. H. Burkill.*

Teucrium Scordium L. This is extinct in all the localities recorded in Dist. 4. Such marshy places as still remain by the Histon Road and near King's Hedges are very limited in extent, and quite unproductive. In Dist. 6 I have looked for this at Mepal and repeatedly at Roswell Pits, Ely, but always in vain. Mr. Bennett informed me that he had a specimen gathered some years ago by Mr. Fryer in the Chatteris district; but in what I (rightly) believed to be the spot there was no trace of the plant in 1895, and I find in Herb. Brit. Mus. a specimen labelled "Pits by Vermuyden's Drain at Horseway, now destroyed, Sept. 17, 1879, A. Fryer." —*T. Scorodonia* L. My search for this at Gamlingay was unsuccessful; it may still occur in White Wood. Beyond Henslow's specimen nothing seems to be known about the Ely record.

Chenopodium ficifolium Sm. 1. Hinton, 1893; *I. H. Burkill.* 5. Fen Ditton. — *C. hybridum* L. 6. Still near Ely, but by no means "common."—*C. rubrum* L. 1. Barnwell, 1894.

Polygonum amphibium L. var. *terrestre* Leers. 2. Dernford Fen, sparingly.

Rumex maritimus L. 6. Still at Roswell Pits and near the river at Ely. — *R. pulcher* L. 1. Hinton; Dullingham. 3. Harston. 5. Fordham. 6. Above Roswell Pits, Ely.—*R. acutus* L. (*R. crispus* L. × *obtusifolius* L.). 6. Near the bridge at Ely.—*R. Acetosella* L. 5. Kennet Heath.

Viscum album L. 1. Borley Wood, on the oak; *A. Shrubbs.* 3.* On lime-trees in various places down "the backs" at Cambridge, pointed out to me by Mr. Shrubbs. Clare Avenue; *I. H. Burkill.*

Thesium humifusum DC. 5. Newmarket Heath, W. of the ditch.

Mercurialis perennis L. 1. Borley Wood; lane below "The Rivey," Linton. Not recorded from the northern half of the county.

Parietaria officinalis L. 5. Burwell Church, 1893; *I. H. Burkill.*

Salix triandra L. 3. By the Bourn Brook at Toft. 5.* By ditches a little S. of Burwell.—*S. aurita* L. 2. Dernford Fen.

Populus tremulus L. 3. Fine in Gamlingay Wood.

Ceratophyllum demersum L. 1. Coe Fen, and 3, in the river at Sheep's Green, Cambridge. 6.* Roswell Pits, Ely.

Juniperus communis L. 1. Sparingly on the Fleam Dyke.

Hydrocharis Morsus-Ranæ L. 3. Sheep's Green, Cambridge.

[*Stratiotes aloides* L. was introduced from the Botanical Gardens into a pond on Sheep's Green, Cambridge, where it has driven out the other aquatic plants.]

Liparis Loeselii Rich. was seen in two localities in Dist. 5 in 1896; in one I saw fine fruiting specimens.

Neottia Nidus-Avis Rich. 3.* Kingston Wood, 1894.

Cephalanthera pallens Rich. 1. I have seen fine specimens of this, gathered by Mr. Shrubbs from a wood on the Gogmagogs. This station is quite distinct from that in which Mr. Clarke found the plant in 1859. 5. Mr. Bennett informs me that there is a specimen of this in Hailstone's herbarium at the York Philosophical Society which was gathered in Wanton's station in 1845.

Epipactis latifolia All. 3.* Kingston Wood, 1894 (*teste A. Bennett*). This is not recorded for Cambs in the *Flora.* Babington says that the Kingston Wood plant is *E. media* Fr.; I have found there two plants of what I take to be that species, but the plant frequent in the wood is certainly true *E. latifolia.* — *E. media* Fr.

1 or 3. "Robinson Crusoe's Island," 1896; *A. Shrubbs, fide I. H. Burkill*. — *E. palustris* Crantz. 1. Coe Fen, Cambridge, 1894; *I. H. Burkill*.

Orchis pyramidalis L. 3. With *Brachypodium pinnatum* Beauv. by the roadside and in adjoining copses, Old North Road, near Kingston Wood. 5. Devil's Ditch. — *O. Morio* L. 2. Dernford Fen, found by Mr. Shrubbs. 3. Pasture by Kingston Wood. — *O. incarnata* L. 5. Chippenham Fen, with *Habenaria conopsea* Benth.

Aceras anthropophora R. Br. 3. There is a specimen in Herb. Brit. Mus. gathered by Mr. F. A. Hanbury at Haslingfield in May, 1863; and I saw it growing there, but very sparingly, in June, 1895. There is no other recent Cambs record, and it is probably extinct both on Hildersham Furze Hills and on Barrington Hill.

Ophrys apifera Huds. 1. Fleam Dyke, in the fen to the N. end, 1894; and 2. Dernford Fen, 1891; *I. H. Burkill*. The latter is doubtless Newbould's station. 3. Very plentiful at Haslingfield in 1894; none to be seen in 1895.

Habenaria chloroleuca Ridley. 1. Borley Wood. Mr. I. H. Burkill found it in the other station given for *Paris*.

Galanthus nivalis L. 2.* River bank near Whittlesford Station, 1890; *I. H. Burkill*.

Allium oleraceum L. 3. With regard to the doubt cast on Mr. Wanton's record on p. 236 of the *Flora*, I have seen a manuscript note of Prof. Babington's which ran: "Mr. Newbould saw the plant and it was *A. oleraceum*." I could only find *A. vineale* L., which is plentiful in the locality.—*A. ursinum* L. 2.* Wood by the river near Whittlesford Station. A very local and rare plant in the county.

Muscari racemosum Mill. 2.* Sparingly by the Royston Road about a mile from Whittlesford Station; and plentifully by a lane connecting Whittlesford with this Royston Road, 1895.

Scilla festalis Salisb. 3. Gamlingay Wood and pastures about the former Heath at Gamlingay; pastures at Hardwick. This is not recorded from Districts 6, 7, and 8.

Paris quadrifolia L. 1. Borley Wood; and near there in a small copse adjoining the Roman Road, with *Orchis maculata* L.

Juncus bufonius L. 4. Chesterton. 6.* Near two windmills to the W. of Ely.

Luzula erecta Desv. b. *congesta* Lond. Cat. 5. Chippenham Fen.

Typha latifolia L. 6.* Plentifully in ditches by and near road between Sutton and the New Bedford River. 7. Sparingly near the bridge at Horseway and in the wash ditch near Sutton Gault.— *T. angustifolia* L. 5. Pit near La Hague Hall, S.E. of Chippenham. 6. Sparingly by the line three miles S. of Ely. 7.* Ditches and ponds near the bridge at Horseway.

Sparganium simplex Huds. 3. Sheep's Green, Cambridge. 5. Ditch by river S.W. of Fen Ditton. — *S. minimum* Fr. 5. Mr. S. Wood and myself found this growing sparingly in Chippenham Fen in 1896.

Lemna trisulca L. 1. (N. end of?) Fleam Dyke, 1894; *I. H.*

Burkill. — *L. polyrrhiza* L. 3. Pit near the spring-head at Hardwick.

Triglochin palustre L. 2. N.W. end of Dernford Fen, abundant. 5. By ditch near river S.W. of Fen Ditton.

Potamogeton natans L. 5. Pond S.E. of Kennet Heath; pit near La Hague Hall, S.E. of Chippenham; Chippenham Fen.—*P. crispus* L. 5.* Ditches near Biggin and White Hall.—*P. pusillus* L. 4. With *Zannichellia palustris* L. in a ditch between Milton and the river, E. of the railway.

Eleocharis acicularis R. Br. 7.* In 1895 the submerged form was plentiful in the Old Bedford River, S.W. of Mepal.—*E. palustris* R. Br. 2.* N. end of Dernford Fen, abundant.

Scirpus pauciflorus Lightf. 2. I found this growing sparingly on Sawston Moor in 1895. It must now be extinct in all the other localities given in the *Flora*.—*S. lacustris* L. 3. Bourn Brook near Fox's Bridge, Comberton, and above there towards Toft. 6.* Roswell Pits, Ely.—*S. Caricis* Retz. 1. Exterminated through drainage in the Cambridge locality. There is now no recorded station in the county in which the plant is known to exist.

Eriophorum latifolium Hoppe. This, too, is extinct in both its recorded Cambs localities; but some years ago Prof. Potter found it in Chippenham Fen (5).

Cladium jamaicense Crantz. 5. Still plentiful in Chippenham Fen—doubtless Relhan's "Chippenham Moor," italicized in the *Flora*.

Carex disticha Huds. 2. Plentiful at the N. end of Dernford Fen. — *C. divulsa* Good. 3. Lane between Trumpington Church and the river. — *C. ovalis* Good. 1.* Sparingly on one of the Hildersham Furze Hills, 1895. 5.* Wicken Fen. Apparently rare and local in the county; as yet it is unrecorded from the whole of the northern half. — *C. elata* All. 2. Very fine near the railway in Dernford Fen. 5. Plentiful in Wicken Fen, and Mr. G. C. Druce and myself noted it in Chippenham Fen.—*C. acuta* L. 3.* Lord's Bridge, near Barton. — *C. ericetorum* Poll. 1. I found this in very small quantity on the Gogmagog Hills, 1895–6. The main reason for its diminution was once given by Prof. Babington in this Journal (1877, p. 85). The practice of carrying away the turf of the Roman Road for use in Cambridge gardens still continues, and threatens several of the Wool-street plants with extinction. The only species not affected are *Cnicus acaulis*, *Poterium Sanguisorba*, and *Linum perenne*, the last-named soon forming very fine plants on the bared places. — *C. verna* Chaix. 2. Whittlesford; Sawston Moor. 3. Kingston. 4. King's Hedges. Unrecorded from Districts 6, 7, and 8. — *C. binervis* Sm. and *C. flava* L. 2. Dernford Fen.—*C. hirta* L. 1. Moory pasture at N. end of Fleam Dyke; lane by "The Rivey," Linton. 2.* Dernford Fen. 5. Pasture near Biggin.

Phalaris arundinacea L. 2.* By stream S. of Shelford Station.

Milium effusum L. 3. Gamlingay Wood. Very local in Cambs.

Phleum phalaroides Koel. 1. Still on the Hildersham Furze Hills, but no longer by the roadside near them.

Calamagrostis epigeios Roth. 5.* Wicken Fen, in great abundance. It is a very remarkable fact that neither in the special list of Wicken Fen plants on p. 313 nor in the body of the *Flora* on p. 270 does Babington record the species for this locality. I consider it the most abundant plant in the Fen, more so than the *Schœnus*, *Cladium*, *Peucedanum palustre*, *Agrostis canina*, *Lastræa Thelypteris*, &c., which are in the *Flora* marked as being, and which still are, abundant there. On the other hand, Babington does, on both pages, record *C. lanceolata* Roth, though without the distinguishing mark of abundance in the locality. I have been unable to find *C. lanceolata* there; and Prof. Babington's own specimen labelled "*C. lanceolata*, Wicken Fen, Cambridgeshire, 20 Sept. 1855" is certainly *C. epigeios*, though a rather small specimen thereof. Except in its differently coloured glumes (which have become golden brown, as usual in the autumn), it is quite indistinguishable from Newbould's specimens of *C. epigeios* from Sawston Fen. The plant is still abundant in the latter locality (= Sawston Moor), and is identical with that from Wicken, of which Mr. Arthur Bennett wrote, "I suspect the f. you send thence is the var. *densiflora* Ledebour, Flora Altaica" (vol. i. p. 87). When in flower the panicle is generally streaked with a purplish black, which gives it quite a different appearance from the light green one from the woods of W. Cambs. The latter plant Mr. Bennett thought was "perhaps the var. *glauca* Rchb."

Sieglingia decumbens Bernh. 2. S.E. side of Dernford Fen, sparingly. Very local in the county.

Koeleria cristata Pers. 2. Gravel-pit near Whittlesford Station.

Molinia varia Schrank. 5. Burwell Fen, 1893; *I. H. Burkill.*

Lolium temulentum L. 3. Field by Kingston Wood, sparingly, 1895.

Scolopendrium vulgare Sym. still grows in Dist. 4.

Ophioglossum vulgatum L. 1. Mossy ground by N. end of Fleam Dyke; *A. Shrubbs.* 3. With *Carex sylvatica* Huds. in a thicket on the ridge between Harlton and Haslingfield chalk-pits. 5. Baitsbite, plentiful.

THE NOMENCLATURE OF SOME SENECIOS.

By James Britten, F.L.S.

In so vast a genus as *Senecio*, any diminution of names is useful: I therefore publish the following reductions, which result from a comparison of the enumeration of species given by Mr. Hemsley in the Botany of the *Biologia Centrali-Americana*, ii. 235–248 (1881–2), with that of Schultz Bipontinus in *Flora*, xxviii. 498 (1845)—a list which was unfortunately overlooked by Mr. Hemsley when preparing his work. These reductions are rendered the more desirable because in most cases the two sets of names are retained in the *Index Kewensis* as if representing different species. There is, however, no question as to their identity in the instances I have quoted, as both Schultz and Mr. Hemsley cite the same synonymy.

The following substitutions must be made:—

S. calophyllus Hemsl. = S. albolutescens Sch. Bip.
S. cardiophyllus Hemsl. = S. ovatifolius Sch. Bip.
S. cirsioides Hemsl. = S. roseus Sch. Bip.
S. desertorum Hemsl. = S. Berlandieri Sch. Bip.
S. eximius Hemsl. = S. callosus Sch. Bip.
S. sessilifolius Hemsl. = S. Beecheyanus Sch. Bip.

The following should stand on the authority of Schultz Bipontinus, not of Hemsley:—

S. amplifolius.
S. cervariæfolius.
S. cirsiifolius.
S. jatrophoides.
S. napeæfolius.
S. radulæfolius.

The following instances of substitution are somewhat more complicated:—

Senecio calocephalus Hemsl. is forestalled by *S. calocephalus* Poepp. & Endl. iii. 58 (1845), and must have a new name; as *Cumingii* is preoccupied in *Senecio*, I propose

SENECIO HEMSLEYI.
S. calocephalus Hemsl. *l. c.* 237, non Poepp. & Endl.
Gynoxys Cumingii Benth. in Vidensk. Meddel. 1852, 106.

Senecio Farfarus Hemsl. must give way to *S. tussilaginoides* Sch. Bip.—although the specific name was earlier applied to other species, in connection with which it now ranks as a synonym. The names will stand:

SENECIO TUSSILAGINIS Less. Syn. Comp. 392 (1832).
Cineraria Tussilaginis L'Hérit. Sert. Angl. 26 (1788).
Senecio tussilaginoides Heynhold, Nomencl. ii. 656 (1856).

SENECIO TUSSILAGINOIDES Sch. Bip. *l. c.* 498.
Cineraria tussilaginoides H.B.K. iv. 168 (1820).
Senecio farfarus Hemsl. *l. c.* 239.

In the case of *Senecio Berlandieri* some confusion has arisen owing to the application of the same specific name to two plants, one of which will have to take a new title. The names may stand:

SENECIO BERLANDIERI Sch. Bip. in Flora, xxviii. 498 (1845).
Cacalia Berlandieri DC. Prodr. vi. 328 (1837).
Senecio desertorum Hemsl. Bot. Biol. Centr. Amer. ii. 239 (1881–2).

SENECIO CONFUSUS.
Senecio Berlandieri Hemsl. *l. c.* 236, non Sch. Bip.; Jacks. Ind. Kew. in part.
Gynoxys Berlandieri DC. *l. c.* 326.

Mr. Jackson in the *Index Kewensis* considers *S. Berlandieri* Sch. Bip. identical with *S. Berlandieri* Hemsl.; but the above synonymy shows that two species are included under the name.

SOME COUNTY LISTS OF MOSSES.

By H. N. Dixon, M.A., F.L.S.

(Continued from p. 188.)

South Hants (v.-c. 11).

The following list of 121 species and six varieties of S. Hants mosses has been compiled from a set of sixty-six voucher specimens collected and sent in to the Botanical Record Club by Mr. E. D. Marquand, and from a list of ninety-six species and varieties communicated by the Rev. E. D. Heathcote; the latter are distinguished here by the initials E. D. H.

Mr. Marquand's specimens were collected chiefly in the neighbourhood of Brockenhurst and Lymington, and have all been verified by me.

Mr. Heathcote's are almost all from the parish of Sparsholt, which is on the extreme northern boundary of Watson's southern division of Hampshire, the Stockbridge road forming his dividing line, and being also for the most part the limit of the parish. It lies wholly on the chalk, but has a good deal of clay in patches, with large woods intersected by broad grass glades and paths that lead on to the downs. The village is 400 ft. above the sea. All his specimens here recorded have been seen either by myself or Mr. E. Charles Horrell.

Sphagnum rigidum var. β *compactum* Schpr. (E. D. H.)—*subsecundum* Nees. — *acutifolium* Ehrh.—*intermedium* Hoffm.

Tetraphis pellucida Hedw. (Mrs. Lyall, E. D. H.)

Catharinea undulata W. & M. (E. D. H.)

Polytrichum aloides Hedw.— *juniperinum* Willd. (E. D. H.)—*formosum* Hedw. (E. D. H.)—*commune* L.

Pleuridium subulatum Rabenh.

Seligeria paucifolia Carr. (E.D.H.)

Ceratodon purpureus Brid. (E. D. H.)

Dicranella heteromalla Schp. — *varia* Schp.

Dicranoweisia cirrata Lindb.

Campylopus subulatus Schp.—*flexuosus* Brid. (E. D. H.) — *pyriformis* Brid. (E. D. H.)

Dicranum Bonjeani De Not.—*scoparium* Hedw. (E. D. H.) — *majus* Turn.

Leucobryum glaucum Schp. Cfr. (E. D. H.)

Fissidens bryoides Hedw. — [Var. *inconstans* Schp. (E. D. H. *fide* H. Boswell).] — *adiantoides* Hedw.—*taxifolius* Hedw.

Grimmia apocarpa Hedw.—*pulvinata* Sm. (E. D. H.)

Rhacomitrium canescens Brid.

Phascum cuspidatum Schreb. (E. D. H.)

Pottia recta Mitt. (E. D. H.)—*truncatula* Lindb. (E. D. H.)

Tortula muralis Hedw.—*subulata* Hedw. (E. D. H.) — *lævipila* Schwgr. — *intermedia* Berk.—*ruralis* Ehrh. (E.D.H.)—*ruraliformis* Dixon.

Barbula rubella Mitt. (E. D. H.) *fallax* Hedw. (Mrs. Lyall, E. D. H.) — *convoluta* Hedw. (E. D. H.) — *unguiculata* Hedw. (E. D. H.)

Weissia crispa Mitt. (E. D. H.)—*microstoma* C. M. (E. D. H.)—

viridula Hedw. (E. D. H.) — *tenuis* C. M. (E. D. H.)

Zygodon viridissimus R. Br.

Ulota crispa Brid. (E. D. H.)— Var. *intermedia* Dixon. —*phyllantha* Brid.

Orthotrichum anomalum var. *saxatile* Milde.—*leiocarpum* B. & S. —*Lyellii* H. & T.—*affine* Schrad. —*stramineum* Hornsch. (E. D. H.)—*tenellum* Bruch. (E. D. H.) —*diaphanum* Schrad.

Splachnum ampullaceum L. (Mr. Marryat; E. D. H.)

Funaria fascicularis Schp. (E. D. H.)—*ericetorum* Dixon.—*hygrometrica* Sibth.

Aulacomnium palustre Schwgr. (E. D. H.)—*androgynum* Schwgr.

Bartramia pomiformis Hedw.

Philonotis fontana Brid.—*calcarea* Schp.

Leptobryum pyriforme Wils. (E. D. H.)

Webera nutans Hedw. (E. D. H.)

Bryum pseudo-triquetrum Schwgr. *cæspiticium* L. (E. D. H.)—*capillare* L. (E. D. H.) — *obconicum* Hornsch.—*alpinum* Huds. (H. N. Dixon, leg. E. D. H.) — *argenteum* L. (E. D. H.)

Mnium affine Bland. (E. D. H.)— *undulatum* L. (E. D. H.)—*hornum* L. (E. D. H.)—*punctatum* L.

Fontinalis antipyretica L.

Cryphæa heteromalla Mohr. (E. D. H.)

Neckera pumila Hedw. — *complanata* Hübn.

Homalia trichomanoides Brid.

Pterygophyllum lucens Brid.

Leucodon sciuroides Schwgr. (E. D. H.)

Porotrichum alopecurum Mitt.

Anomodon viticulosus H. & T.

Leptodon Smithii Mohr.

Thuidium hystricosum Mitt. (E. D. H.) — *tamariscinum* B. & S. (E. D. H.)

Climacium dendroides W. & M.

Isothecium myurum Brid.

Pleuropus sericeus Dixon (E. D. H.)

Brachythecium albicans B. & S.— *rutabulum* B. & S. (E. D. H.)— *rivulare* B. & S. — *velutinum* B. & S. (E. D. H.) — *populeum* B. & S. — *illecebrum* De Not.— *purum* Dixon (E. D. H.)

Eurhynchium piliferum B. & S.— *crassinervium* B. & S. (E. D. H.) —*prælongum* B. & S. (E. D. H.) —*tenellum* Milde (E. D. H.) — Var. *scabrellum* Dixon (E. D. H.) — *myosuroides* Schpr. (E. D. H.)—*striatum* B. & S. (E. D. H.)—*confertum* Milde.

Plagiothecium denticulatum B. & S. —*sylvaticum* B. & S. (E. D. H.) —*undulatum* B. & S.

Amblystegium serpens B. & S.

Hypnum chrysophyllum Brid. — *fluitans* L. — *exannulatum* Gümb.—*revolvens* Sw.—*cupressiforme* L. (E. D. H.) — Var. *resupinatum* Schp. — *molluscum* Hedw. (E. D. H.) — *scorpioides* L.—*cuspidatum* L. (E. D. H.) —*Schreberi* Willd. (E. D. H.)

Hylocomium splendens B. & S.— *loreum* B. & S. — *squarrosum* B. & S. (E. D. H.)—*triquetrum* B. & S.

North Hants (v.-c. 12).

This list of ninety-eight species and three varieties has been compiled from two separate published lists, and from a number of records sent in to the Botanical Record Club, which have not previously been published. The earliest list is one in the *Flora of Andover*, by C. B. Clarke, published in 1866, and which contained fifty-two mosses. The second is contained in an article in vol. i. (1870–71) of the *Proceedings* of the Newbury District Field Club, by H. Reeks, "On the Flowering Plants, Ferns, and Mosses observed in the

Parish of East Woodhay." This contained the names of ninety mosses, many of them confirmed by Braithwaite. The vouchers sent in to the Botanical Record Club were collected by H. F. Parsons, and were twenty-six in number. These last have all been examined by me.

Sphagnum cymbifolium Ehrh. (H. R.) — *subsecundum* Nees (Miss Armitage). — *squarrosum* Pers. (C. B. C.) — *acutifolium* Ehrh. (H. R.)

Catharinea undulata W. & M. (C. B. C.)

Polytrichum nanum Neck. (H. R.) —*aloides* Hedw. (C. B. C.) — *piliferum* Schreb. (Miss Armitage).—*juniperinum* Willd. (C. B. C.) — *gracile* Dicks. (H. R.) — *formosum* Hedw. (H. R.)— *commune* L. (H. R.)

Pleuridium subulatum Rab. (C. B. C.)

Ceratodon purpureus Brid. (C.B.C.)

Dicranella heteromalla, Schp. (H. R.)—*varia* Schp. (C. B. C.)

Dicranoweisia cirrata Ldb. (C.B.C.)

Campylopus pyriformis Brid. (H. F. P.)

Dicranum Bonjeani De Not. (C. B. C.) — *scoparium* Hedw. (C. B. C.)—*majus* Turn. (H. R.)

Fissidens viridulus Wahl. (C.B.C.) —*bryoides* Hedw. (C. B. C.)— *adiantoides* Hedw. (H.R.)—*taxifolius* Hedw. (H. F. P.)

Grimmia apocarpa Hedw. (C.B.C.) —*pulvinata* Sm. (H. R.)

Rhacomitrium lanuginosum Brid. (C. B. C.)

Acaulon muticum C. M. (H. R.)

Phascum cuspidatum Schreb. (H. R.)

Pottia truncatula Ldb. (H. R.)— *Starkeana* C. M. (H. R.) — *lanceolata* C. M. (C. B. C.)

Tortula pusilla Mitt. (C. B. C.)— *muralis* Hedw. (C. B. C.)—*subulata* Hedw. (C. B. C.)—*ruralis* Ehrh. (C. B. C.)

Barbula fallax Hedw. (C. B. C.) —*spadicea* Mitt. (H. R.) — *unguiculata* Hedw. (H. R.)

Weisia viridula Hedw. (C. B. C.) —*curvirostris* C. M. (C. B. C.)

Trichostomum mutabile Bruch. (H. R.)

Encalypta vulgaris Hedw. (C.B.C.)

Ulota crispa Brid. (H. R.)

Orthotrichum cupulatum Hoffm. (H. R.)—*Lyellii* H. & T. (C. B. C.) — *affine* Schrad. (C. B. C.) —*diaphanum* Schrad. (H. R.)

Physcomitrium pyriforme Brid. (H. R.)

Funaria hygrometrica Sibth. (C. B. C.)

Bartramia pomiformis Hedw. (C. B. C.)

Philonotis fontana Brid. (C. B. C.)

Webera nutans Hedw. (C. B. C.)

Bryum intermedium Brid. (C.B.C). —*cæspiticium* L. (C. B. C.)— *capillare* L. (C. B. C.) — *argenteum* L. (C. B. C.) — *roseum* Schreb. (H. R.)

Mnium affine Bland. (C. B. C.)— *cuspidatum* Hedw. (H. R.) — *undulatum* L. (C. B. C.) — *hornum* L. (H. R.)—*stellare* Reich. (H. R.)—*punctatum* L. (H. R.)

Fontinalis antipyretica L. (C.B.C.)

Homalia trichomanoides Brid. (H. R.)

Leucodon sciuroides Schwgr. (H. F. P.)

Porotrichum alopecurum Mitt. (C. B. C.)

Anomodon viticulosus H. & T. (H. F. P.)

Thuidium tamariscinum B. & S. (C. B. C.)

Isothecium myurum Brid. (C.B.C.)

Pleuropus sericeus Dixon (C.B.C.)

Camptothecium lutescens B. & S. (C. B. C.)

Brachythecium glareosum B. & S. (H. F. P.) — *rutabulum* B. & S. (C. B. C.) — *velutinum* B. & S.

(C. B. C.) — *illecebrum* De Not. (H. R.)—*purum* Dixon (C.B.C.)

Eurhynchium piliferum B. & S. (H. F. P.)—*crassinervium* B.&S. (Miss Armitage). —*prælongum* B. & S. (C. B. C.) — *Swartzii* Hobk. (C. B. C.) — *myosuroides* Schp. (C. B. C.) — *striatum* B. & S. (C. B. C.) — *striatulum* B. & S. (C. B. C.) — *rusciforme* Milde (H. F. P.) — *confertum* Milde (H. R.)

Plagiothecium denticulatum B. & S. (H. R.) — *sylvaticum* B. & S. (C. B. C.)

Amblystegium serpens (C. B. C.)

Hypnum riparium L. (H. R.) — *stellatum* var. *protensum* B. & S. (H. F. P.) — *aduncum* var. *Kneiffii* Schp. (H. F. P.) — *cupressiforme* L. (C. B. C.) — Var. *resupinatum* Schp. (C. B. C.) — *molluscum* Hedw. (C. B. C.) — *cuspidatum* L. (H. R.)

Hylocomium splendens B. & S. (C. B. C.) — *squarrosum* B. & S. (H. R.) — *triquetrum* B. & S. (C. B. C.)

BIBLIOGRAPHICAL NOTES.

XV.—Gronovius's 'Flora Virginica.'

It has been generally understood that the descriptions of new plants in the *Flora Virginica* were based, not upon the bibliographical references to previous authors, but upon the specimens collected by Clayton. It is true that these are cited after the synonymy, where such exists, but the title of the book seems to make it abundantly clear that Clayton's plants are the types of the descriptions. It runs thus: "Flora Virginica exhibens plantas quas v. c. Johannes Clayton in Virginia observavit atque collegit. Easdem Methodo Sexuali disposuit, ad Genera propria retulit, Nominibus specificis insignivit, et minus cognitas descripsit Joh. Fred. Gronovius." It is of course well known that Clayton's specimens were acquired by Banks—they are entered in Dryander's Catalogue (iii. 186) as "specimina sicca Claytoniana (ex herbario J. F. Gronovii) quæ adornandæ huic floræ [i. e. *Flora Virginica*] inservierunt"—and they are now incorporated with the general herbarium at the British Museum.

It would appear, however, that the importance of Clayton's plants as types of many Linnean species is at present in danger of being overlooked by the younger American botanists. Two instances of this have just come under my notice; and I propose to offer a few remarks upon the subject, as at the same time it gives me an opportunity of once more calling attention to other existing early types.

1. Asclepias verticillata L.

Miss A. M. Vail, in the course of her "Studies in the Asclepiadaceæ,"* rightly points out that "this species was based on *Asclepias foliis verticillatis lineari-setaceis* Gronovius, Virg. 26 (1739)." She proceeds, however, to say that Gronovius's plant was "in its turn founded on *Apocynum Marianum erectum Linariæ angustissimus foliis umbellatum—Apocyno recto non ramoso. Roris marini foliis umbellis florum candidis* Plunkenet [*sic*], Mantissa, 17, pl. 336 (1700)."

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* Bull. Torrey Bot. Club, April, 1898, 174.

It is, I think, perfectly clear that Clayton's plant must be regarded as the type of Linnæus's description. Gronovius's descriptive phrase stands as the first citation in the *Species Plantarum*, and this alone, by the American rule of priority in place, would entitle it to be considered as the foundation of the Linnean species. The references to Plukenet and Petiver—the latter author, by the way, is also cited by Gronovius, and has, I think, an equal claim with Plukenet to consideration—are the same (save for slight textual variation) as in the *Flora Virginica*, but Linnæus places them after the Gronovian description.

There is in this case no doubt as to the identity of the plant in all three references; but in the quite possible event of a difference between them, it becomes important to know which is absolutely the type of the species.

I would point out incidentally that Miss Vail's citation from the *Mantissa*, although placed in inverted commas, is not an exact quotation, and does not quite accurately represent what Plukenet said. This will be evident if the following transcription of the passage be compared with that quoted above: "Apocynum *Marianum* erectum Linariæ angustissimis foliis umbellatum, apud *D. Doody*. Apocyno recto non ramoso Rorismarini foliis umbellis florum candidis *Almagest. Bot.* [36] plurimùm convenit." The last four words, which imply a certain doubt as to the identity of the two plants, are omitted by Miss Vail; but the uncertainty was also expressed by Petiver (Mus. no. 609), who is, equally with Plukenet, cited by Gronovius and Linnæus, and who calls the plant "Apocynum *Marianum* foliis angustissimis stellatis," adding "*an*? A. erect. non ramosum Rorismarini folio," etc.

This latter synonym first appears in the list of plants at the end of Ray's *Hist. Plant.* (pp. 1926 (sphalm. "1928")–1928), "e Catalogo huc transmisso *Anno* 1680, quem composuit eruditissimus Vir et consummatissimus Botanicus D. *Johannes Banister* Plantarum à seipso in Virginia observatarum." It stands sixth in his list of Apocyni, and is called "Apoc. erect. non ram. Roris marini foliis umbellis florum candidis." In the collection of plants from Banister in Herb. Sloane xcii (fol. 16) is a specimen with a ticket by Plukenet, "Apocyn. rect. Virg. Rosmarini fol. D. Banister. Linariæ foliis potiùs"; and in the same Herbarium (xxxvii. fol. 86) is a Maryland specimen from Krieg or Vernon, to which is appended in Ray's hand a note: "An Apocynū 6tum Banist. Cat."

It may be worth while to note that we have also in Herb. Sloane other specimens: from Carolina, Catesby (ccxii. 30); Virginia, Marshall (clviii. 290); Maryland, Jones or Krieg (lxxiv. 68) and Vernon (ccxlvi. 24). Marshall's specimen bears a note in his hand:—"This is y^e Sneak Root good to expell y^e bite of a Rattle Sneak"; it is identified by Petiver with no. 609 of his *Museum*. We have also a specimen and drawing in William Young's collection of Carolina plants (1767).

In the Banksian herbarium we have, besides Clayton's Virginia specimen, one in fruit from John Bartram, with a note: "This plant I never observed but upon one hill a days journey beyond y^e^ blew mountains when I went to find y^e^ head of sculkill. This is y^e^ state I found it in so I cant tell what flower it bears." Another Banksian specimen is indorsed "Cherrokee countrey, W. V. Turner, 1769. Indian name Chera Notse Younnoste—Pine leav'd plant." Banks had a large number of "Cherrokee" plants from Turner, nearly all of which bear the "Indian name." Miller grew the plant in Chelsea Garden (whence we have it) in 1760, and his herbarium contains specimens sent to him by Houstoun.

I have cited these early collections because I do not think it is always sufficiently recognized that our National Herbarium affords a rich store of early American material, which the officials are always willing to render accessible, so far as comparison of specimens goes, to transatlantic workers.

2. Antennaria plantaginea Br.

Mr. M. L. Fernald* writes: "Linnaeus, in the first edition of the *Species Plantarum*, founded the species *Gnaphalium plantaginifolium* upon the 'White Plantain' of Plukenet's *Almagestum Botanicum*. The description by Linnaeus is characteristically short, and without his reference to Plukenet's figure it would be difficult to say just what plant he had in mind, though his note, 'Habitat in Virginia,' is at least a suggestion." Later on, Mr. Fernald says "The first evidence must be looked for in Plukenet's figure."

A comparison of Linnæus's description with those cited by him from Gronovius and Plukenet makes it even more clear than in the case of the *Asclepias* that the Linnean plant is based upon Gronovius, and that the reference to Plukenet is merely the citation of a synonym. Here are the three as they stand in *Species Plantarum*, i. 850:—

"Gnaphalium caule simplicissimo, foliis radicalibus ovatis maximis, sarmentis procumbentibus.

"Gnaphalium stolonibus reptatricibus longissimis, foliis ovatis, caule capitato. *Gron. virg.* 95.

"Gnaphalium plantaginis folio, virginianum. *Pluk. alm.* 171 *t.* 348 *f.* 9."

How, in the face of this citation from *Flora Virginica*, Mr. Fernald can say that "without his reference to Plukenet's figure, it would be difficult to say just what [Linnæus] had in his mind," I cannot understand. Clayton's specimen, "stolonibus reptatricibus longissimis," is sufficient evidence as to what Linnæus intended, and is far more in accord with his description than is Plukenet's phrase or figure.

Although it is, I think, already clear that Linnæus in these two instances, as in very numerous others, had Gronovius's descriptions in view, it must not be overlooked that he was also in frequent correspondence with Gronovius, and that he received from him specimens of Clayton's plants. Writing to Haller Oct. 8, 1737, he says: "Gronovius will, doubtless, soon publish the plants sent by Clayton from Virginia, unless he considers too long about the matter"; and on Jan. 23, 1738: "I wish [Gronovius] had not so long hesitated to publish his book. He is too timid."* Smith, writing of Gronovius, says: "Gronovius received from Clayton various specimens of Virginian plants, which he, *with the assistance of Linnæus*, then resident in Holland, arranged according to the sexual system, and with proper specific characters, descriptions, and synonyms, published under the title of *Flora Virginica*"; and again: "He was in frequent correspondence with Linnæus, *whom he furnished with numerous specimens* of American plants sent by Clayton."† Linnæus also acknowledges his indebtedness to Gronovius's Herbarium in the preface to the first edition of the *Species Plantarum:* it is moreover certain that in some instances at least he had before him the actual specimens from Clayton on which Gronovius based his descriptions—as in the case of *Dolichos regularis* L. (*Galactia glabella* Mich.) which bears the Linnean name in Linnæus's own hand.

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* Asa Gray Bulletin, v. 91 (Dec. 15, 1897).

James Britten.

BIOGRAPHICAL INDEX OF BRITISH AND IRISH BOTANISTS.

By James Britten, F.L.S., and G. S. Boulger, F.L.S., F.G.S.

First Supplement (1893–97).

(Continued from p. 195.)

Hind, Rev. William Marsden (1815–94): b. near Belfast, 21 Feb. 1815; d. Walsham-le-Willows, Suffolk, 13 Sept. 1894; bur. Staplehill. B.A., Dublin, 1839. LL.D., 1870. Curate of Derriaghy, Co. Down, 1839. Perpet. Curate, Pinner, 1861. Rector of Honnington, Suffolk, 1875. Contrib. to Melvill's 'Flora of Harrow,' 1864; edited ed. 2, 1876. 'Flora of Suffolk,' 1889. British herbarium at Trin. Coll., Dublin; Suffolk herbarium at Ipswich Museum. Jacks. 253; R.S.C. iii. 358; vii. 984; Journ. Bot. 1894, 352.

Hogg, Robert (1818–97): b. Coldstream, 1818; d. Pimlico, 14 March, 1897. Horticulturist. F.L.S., 1861. LL.D. Editor of Cott. Gardener, afterwards Journal of Horticulture. 'Vegetable Kingdom,' 1858. Edited Miss Plues's 'Eatable Funguses' (with G. W. Johnson), 1866, and Notcutt's 'Handbook of Brit. Pl.,' ed. 2, 1871. 'Wild Flowers of Great Britain' (with G. W. Johnson), 1861–80. Pritz. 147; Jacks. 560; Proc. Linn. Soc. 1896–7, 57; Gard. Chron. 1897, i. 188 (portr.).

Holland, Robert (1829–93): b. Peckham, Surrey, 2 Aug. 1829; d. near Acton Grange, Cheshire, 16 July, 1893. Contrib. to

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* *Correspondence of Linnæus*, ii. 300, 314.

† Rees, *Cyclopædia*, xvii.

Grindon's 'Manchester Flora,' 1859. 'Dictionary of English Plant-names' (with J. Britten), 1878-86. Jacks. 10; Journ. Bot. 1893, 241; R.S.C. iii. 404; vii. 1006.

Home, Sir Everard (1756-1832): b. Hull, 6 May, 1756; d. Chelsea Hospital, 31 Aug. 1832. Surgeon. F.R.S., 1785. Baronet, 1813. Went to Jamaica, N. Zealand, N. Caledonia, &c. Plants (N. Caledonia, &c.) at Brit. Mus. and Kew. Sent living plants to Kew. Correspondence at Kew. Dict. Nat. Biog. xxvii. 227. R.S.C. iii. 413. Portr. by Sir W. Beechey, engr. in his 'Lectures on Comp. Anatomy. *Santalum Homei* Seem.

Hooper, James (d. 1830); d. at sea, Dec. 1830. Kew gardener. Botanic gardener under Abel on Lord Amherst's embassy to China, 1816-7. Hortulanus at Buitenzorg Bot. Garden, 1817-30. Kew Bulletin, 1893, 174.

Hopkins, Esther, *née* **Burton** (1815-97): b. 18 Nov. 1815; d. Chester, 27 May, 1897; bur. Bath. Contrib. to Top. Bot. Memb. Bot. Exch. Club. Discovered *Potamogeton decipiens* in England. Bot. Exch. Club Report, 1866, 13; Journ. Bot. 1867, 71. Herbarium in possession of Dr. D. M. Atkinson, Royal Infirmary, Glasgow. *Potamogeton Burtoni* Hopkins = *P. decipiens* Nolte.

Houlton, Joseph (1788-1861): b. Saffron Walden, Essex, 29 Feb. 1788; d. London, 14 Jan. 1861. M.R.C.S. M.D., Erlangen. F.L.S., 1823. Surgeon to E. Norfolk militia till 1817. Practised at Saffron Walden and (from 1823) in London. Prof. Bot. to Medico-botanical Society of London. Licensed Lecturer by Society of Apothecaries. 'Esculent qualities of the root-stock of *Stachys palustris*,' 1828. Contrib. to Pharm. Journ. R.S.C. iii. 446; 'Medical Times and Gazette,' 1861, 565.

How, Rev. William Walsham (1823-97): b. Shrewsbury, Salop, 13 Dec. 1823; d. Leenane, Connemara, 10 Aug. 1897; bur. Whittington, near Oswestry. B.A., Oxon, 1845; M.A., 1847; D.D., 1886. D.D., Lambeth, 1879. Bishop of Bedford, 1879; of Wakefield, 1888. A founder of the Oswestry and Welshpool Field Club, 1857. Pres. Yorksh. Nat. Union, 1890. Had a herbarium. 'Botany of Great Orme's Head,' in Proc. Oswestry and Welshpool Field Club, 1865. Pl. list in Roberts's 'Gossiping Guide to Wales.' Naturalist, 1897, 299, with portr.; Journ. Bot. 1897, 464.

Hunter, Rev. Robert (1824?-97): d. Epping, Essex, 25 Feb. 1897. M.A., Aberdeen. LL.D. Missionary Free Church of Scotland in India. Collected in Bermuda, 1884. 'Bermuda Ferns,' Journ. Bot. 1887, 367. Plants in Herb. Mus. Brit. Journ. Bot. 1897, 158; R.S.C. iii. 476; x. 295.

Hunter, Rev. Sylvester Joseph (1829-96): b. Bath, 13 Sept. 1829; d. Stonyhurst College, Blackburn, 20 June, 1896. M.A., Cambridge. S.J. 'Conjugation in Spirogyra,' Journ. Bot. 1885, 185. Stonyhurst Magazine, July, 1896.

Huxley, Thomas Henry (1825-95): b. Ealing, Middlesex, 4 May, 1825; d. Eastbourne, Sussex, 29 June, 1895; bur. Finchley Cemetery. Assistant-Surgeon, R.N., 1846, on H.M.S. 'Rattlesnake,' 1846–50. D.C.L., Oxon, 1885. F.R.S., 1851. Pres. R.S., 1883. F.L.S., 1858. Prof. Nat. Hist. Royal School of Mines, 1854–85. 'Gentians,' Journ. Linn. Soc. xxiv. 101–124 (1887). R.S.C. iii. 482; vii. 1045; x. 302; Proc. Royal Soc. 1895–6, xlvi., with portr.; Journ. Bot. 1895, 312; 'Times,' 1 July, 1895; Alumn. Oxon. Portr. by Collier at Royal Soc.

Inchbald, Peter (1816–96): b. Adwick Hall, Doncaster, 1816; d. Hornsea, Yorkshire, 13 June, 1896. F.L.S., 1880. Knew British and S. European plants. 'Llandudno Botany,' 1864. Papers on Yorkshire plants in Phyt. iii. (1848–9). Proc. Linn. Soc. 1896–7, 58; Jacks. 255; R.S.C. iii. 493; viii. 3; x. 306.

Jenner, Charles (1810–93): b. Chatham, Kent, 1 Sept. 1810; d. Portobello, Edinburgh, 27 Oct. 1893. Draper in Edinburgh from 1830. F.B.S.E., 1851; President, 1867. Algologist. Had a bot. garden at Portobello. Discovered *Cnicus Carolorum*. Contrib. to Trans. Bot. Soc. Ed. vols. v.–ix. R.S.C. iii. 544; viii. 23; Trans. Bot. Soc. Ed. xx. 23 (with bibl.). *Didymodon Jennerii* Schimper.

Jenyns. *See* **Blomefield.**

Johnson, Charles Pierpoint (d. 1893): d. Camberwell, Surrey, 6 March, 1893. Son of Charles Johnson. 'British Wild Flowers,' 1858–60; ed. 3, 1876. 'British Poisonous Plants,' ed. 2, 1862 (with Charles Johnson). 'Useful Plants of Great Britain,' 1861–2; ed. 2, 1863. Pritz. 157; Jacks. 564; Journ. Bot. 1893, 128.

Justen, Joseph (1836–65): b. Bonn, 1836; d. London, 1865; bur. Highgate. Had collection of woods. 'Notes on Wood,' 1864.

Kerr, James (fl. 1779). Surgeon. 'Account of tree producing the Terra Japonica.' Med. Obs. & Inquiries, v. 148 (1779).

Kilburn, William (1745–1818): b. Dublin, 1745; d. Workington, 23 Dec. 1818. Artist and calico-printer. Drew and engraved plates for 'Flora Londinensis.' Dict. Nat. Biogr. xxxi. 101. Indexes to Bot. Mag. (1828), p. ix.

King, Thomas (1834–96): b. Lochwinnoch, Renfrew, 14 April, 1834; d. Fochabers, Elgin, 14 Sept. 1896; bur. Paisley Abbey. Mycologist. Prof. Bot. Anderson's Coll. Glasgow, 1889. President N. H. Soc. Glasgow, 1893–6; of the Microscop. Soc. Glasgow, 1892–5. Collected at Valparaiso, 1864–73. Edited Hennedy's Clydesdale Flora. Journ. Bot. 1896, 487; Ann. Scott. Nat. Hist. 1897, 1; Trans. Nat. Hist. Soc. Glasgow, 1896–7, with portr. and bibliog. *Alstrœmeria Kingii* Philippi, &c.

Kirby, Mary. *See* **Gregg.**

Kitton, Frederic (1827–95): b. Cambridge, April, 1827; d. West Kensington, 22 July, 1895. Tobacconist. Diatomist and microscopist. Hon. Memb. R.M.S. R.S.C. viii. 83; x. 407; Journ. Bot. 1895, 312; Journ. Quekett Micr. Club. Nov. 1895, 152.

Knight, Joseph (1781?–1855): b. near Hoghton, Gloucestershire, 1781?; d. Bitham House, Banbury, 27 July, 1855. Gardener to Hibbert, and, from about 1809, nurseryman at Chelsea. 'Proteæ,' 1809. 'Coniferous Plants,' 1850. Pritz. 166; Jacks. 141, 408; Journ. Bot. 1886, 296; Trans. Hort. Soc. i. 262; Gillow, Dict. Catholic Biography, vol. iv.

Koenig, Johann Gerhard (1728-85): b. Courland?, 1728?; d. Jagrenatporum, India, 26 June, 1728. Pupil of Linnæus. In Iceland, 1765, Linn. Mantissa Gen. Pl. 13. In India from about 1768. Physician to the Danish settlement in Carnatic. Naturalist to the Nabob of Arcot. On the Madras establishment of the East India Co. in 1778. Bequeathed his plants and MSS. to Banks. Collected in Ceylon, Malacca, Siam. Pritz. 168; Roxburgh, Coromandel Plants, pref.; Banks Corresp. iv. July 9, 1785.

Krieg, David (fl. 1699-1703): b. in Saxony. F.R.S. Physician. Collected in Maryland. Correspondent of Dale. Sent plants to Petiver, Mus. Pet. 45, 95. Plants in Herb. Sloane xxxvii, lxxiv, xcii; Pult. ii. 57; Ray Hist. Pl. iii. pref. p. iii.

Lawson, George (1828?-95): b. Dundee, Scotland, 1828?; d. Halifax, Nova Scotia, 10 Nov. 1895. F.B.S.Edinb. Assistant to J. H. Balfour, 1848. Prof. Nat. Hist., Kingston, Canada, 1858. Prof. Chemistry, Halifax, Nova Scotia. 'Hist. of Water-lilies,' 1850. 'Synopsis of Canadian Ferns,' 1864. Pritz. 177; Jacks. 570; Journ. Bot. 1896, 48; R.S.C. iii. 895; viii. 177; x. 532; Athenæum, 1895, ii. 722.

Lawson, Marmaduke Alexander (1840-96): b. Seaton Carew, Durham, 20 Jan. 1840; d. Madras, 14 Feb. 1896. M.A., Camb., 1864. F.L.S., 1869. Prof. Bot., Oxon, 1868-82. Director Bot. Dep., Ootacamund, 1882. Contrib. to 'Flora of Trop. Africa' and 'Flora of British India.' Herb. of Ootacamund pl. at Madras. R.S.C. vii. 178; x. 532; Journ. Bot. 1896, 191, 239; Proc. Linn. Soc. 1895-6, 40; Kew Bull. 1896, 185; Druce, Fl. Berks. clxxvii.

Leeds, Edward (1802-77): b. Pendleton, 9 Sept. 1802; d. Bowdon, Cheshire, 1877; bur. Bowdon. Hybridized Narcissi. Gard. Chron. 1894, ii. 561, 625.

Leipner, Adolph (1827-94): b. Dresden, 13 Aug. 1827; d. Clifton, Gloucestersh., 1 April, 1894. Settled at Clifton, 1854. Lecturer on Bot., Univ. Coll., Bristol. Formed bot. garden of the College. A founder of Bristol Naturalists' Society, 1862. 'Silica in Rubiaceæ,' Journ. Microscop. Sci. v. (1857), 134. 'Mosses of Bristol,' Proc. Bristol Nat. Hist. Soc. iii. (1868), 21. R.S.S. iii. 944; viii. 198; Journ. Bot. 1894, 224.

Leitch, John (1859?-1896): b. Monimail, Fife, 1859?; d. Silloth, Cumberland, 22 Dec. 1896. M.B., Edinb., 1871. Had a herbarium; did not publish. Journ. Bot. 1897, 112.

Levinge, Harry Corbyn (1831?-96): b. 1831?; d. Knockdrin Castle, Mullingar, 11 March, 1896. Secretary Bengal Public Works Dept. Collected ferns in Sikkim, Kashmir, and Nilghiris. Discovered *Chara denudata* in Ireland. Contrib. to

Irish Naturalist and Journ. Bot. '*Neotinea intacta*,' Journ. Bot. 1892, 194. Brit. herbarium bequeathed to Dublin Mus. Science and Art. Journ. Bot. 1896, 240; Nature, April 23, 1896; Irish Naturalist, 1896, 107. *Adiantum Levingei* Baker.

Lloyd, James (1810–96): b. 1810; d. Nantes, May 10, 1896. 'Flore de l'Ouest de la France,' 1854; ed. 4, 1886. Comp. Bot. Mag. ii. 265; Pritz. 194; R.S.C. iv. 65, viii. 246; Journ. Bot. 1896, 328.

Lobb, Thomas (d. 1894): b. Cornwall; d. Devoran, Cornwall, 30 April, 1894. Collector for Veitch in India and Malaysia from 1840. List of his plants (by Planchon) in Journ. Bot. 1847–8. Journ. Bot. 1894, 191; Gard. Chron. 1894, i. 636; Cott. Gard. xiii. 274. *Lobbia* Planch.

Lomax, Alban Edward (1861–94): b. 1861; d. Liverpool, 4 May, 1894. Pharmaceutical Chemist. Described *Cerastium carpetanum*, Journ. Bot. 1893, 331. Herb. at Univ. Coll., Liverpool. Journ. Bot. 1894, 384.

Lomax, Elizabeth Ann, *née* **Smithson** (1810–95): b. Pontefract, Yorksh., 22 Feb. 1810; d. Torquay, Devon, 16 March, 1895; m. Robert Lomax, 1842. Memb. Bot. Exchange Club. Herbarium at Owens Coll., Manchester. Journ. Bot. 1895, 160.

Lousley, Job (1790–1855): b. Newbury, Berks, 20 Nov. 1790; d. Hampstead Norris, Berks, 8 July, 1855; bur. Hampstead Norris. Contrib. localities to Hewett's Hist. of Compton Hundred, and to Mrs. Anna Russell's Hist. of Newbury. Druce, Fl. Berks, clxviii.

Lyall, David (1817–95): b. Auchinblae, Kincardineshire, 1 June, 1817; d. Cheltenham, Gloucestershire, 2 March, 1895. M.D., Aberdeen. R.N., 1839. F.L.S., 1862. Assistant-surgeon and botanist on H.M.S. 'Terror' in Sir James Ross's Antarctic Voyage, 1839–42. Collected 1500 spp. Surgeon and naturalist on H.M.S. 'Acheron' in New Zealand, 1847. Discovered *Ranunculus Lyallii*. In Arctic Regions with Sir E. Belcher, 1852. On British Columbia Boundary Commission, 1858; collections described in Journ. Linn. Soc. vii. (1863), 124–147. R.S.C. iv. 137; Journ. Bot. 1895, 209. *Lyallia* Hook. f.

(To be continued.)

JAMES WARD.

[The *Stonyhurst Magazine* for June contains a memoir of James Ward, of whom a short notice appeared in this Journal for July, 1873. As the memoir is not likely to come into the hands of our readers, we reprint such portions of it as relate to Ward's connection with British botany. Edward Forster may be added to the list given of Ward's correspondents (see E. Bot. Suppl. 2737).—Ed. Journ. Bot.]

James Ward was born at Wensley, in Yorkshire, on Christmas Day, 1802. He was the second of seven sons of Robert Ward, of Wensley, whose grandfather, Robert Ward, migrated from Ingerthorpe, near Ripon, to Wensley about the year 1720, disposing of his estate in that district to William Wilberforce, of Kingston-upon-Hull, grandfather of the great philanthropist.

There is not much to record of Mr. Ward's early life beyond the fact that he was educated at a school at Leyburn, a small town about two miles distant from Wensley, and one of the most picturesque spots in the Yorkshire "dales." At the age of fourteen he went to Richmond to live with his uncles John and Charles Ward, and to learn their business, which was that of chymists and oil merchants. As part of his work he had to study the medicinal virtues of plants; he had also to help his uncles to cultivate a large garden. In 1821 his uncle, John Ward, started the Richmond Florist Society for the promotion of the cultivation of flowers and fruits.

John Ward was a botanist, and had a large number of botanical books. In early life he had gone to London to study for the medical profession, but not caring for the surgical part of it had given it up. He now directed his nephew's studies and fostered his taste for plants, so that the young man commenced to scour the country in search of every kind and variety of plant. The hours of work in those days were very long, being from 7 a.m. until 8 p.m. This left very little time for leisure or for botanizing, and yet, "where there's a will there's a way," and the young botanist rose at four o'clock in the morning, spent three hours in the woods or on the moors, and was back at seven o'clock, ready to begin his daily duties. The work in his uncle's establishment was not of a light nature, for the communications with wholesale houses were not so quick as in these times, and most of their goods came by water from London to Stockton. They, however, manufactured a large number of things on their own premises, so that a distilling of various essences was always going on, besides the constant moving of oil barrels, for the oil department constituted the largest part of the business in the days before gas was introduced. When gas was introduced, Mr. John Ward was the first in Richmond to manufacture it. Occasionally James would get a day's holiday which he would employ in botanizing, starting at dawn and wandering over the hills and dales for nearly fifty miles, collecting plants all the time, and returning home when he could no longer see.

In 1824 James Ward compiled a list of plants growing in North Yorkshire; the districts to which he chiefly devoted himself were the valleys of the Swale, Yore, and Tees. In 1825 he had collected 666 species. In 1827 he had 830 species; in 1831, 1027 species; in 1836, 1318 species; in 1844, 1454 species; in 1856, 1591 species; in 1863, 1642 species; in 1871—his last entry—1753 species. These refer to the British Herbarium alone, which he looked upon as the most valuable, and besides this he had his Exotic Herbarium, containing foreign as well as English plants.

In 1833 Mr. Hewett Cottrell Watson published his *New Botanist's Guide*, containing Mr. Ward's catalogue of North Yorkshire plants. Until Mr. Ward's death in 1873 this veteran botanist corresponded with him as to plants, their varieties and habitats, and his catalogues of plants were continually referred to as authorities for North Yorkshire in Mr. Watson's numerous works on the geographical and topographical distribution of plants. He had also a lifelong friendship with the Rev. J. E. Leefe, in connection with whom he published in 1842–3 two volumes of British dried Willows. Besides Willows, Mr. Ward devoted a good deal of attention to the groups of Roses and Hieracia. At first all his specimens were arranged according to the Linnean classification. Later he arranged them according to the natural orders, but his first and best collection, now at Stonyhurst, remains in the Linnean classification. The value of this herbarium is enhanced by the fact that many of its rarer specimens were supplied by the leading botanists of the period, and can therefore be depended upon as accurately named, according to the nomenclature recognized at that time. Mr. J. G. Baker was one of Mr. Ward's friends and correspondents. Amongst his other botanical correspondents may be mentioned Sir W. Hooker, Sir J. D. Hooker, Professors Henslow, Balfour, and Babington; also Dr. Boswell Syme and Dr. Arnold Lees.

On the 12th of May, 1836, Ward was chosen a Fellow of the Botanical Society of Edinburgh, then but recently established. In 1847 he became corresponding local secretary to the London Botanical Society. He had an immense number of duplicate specimens to exchange with private correspondents. He not only collected plants and ferns, but mosses, lichens, sea-weeds, confervæ, fungi, etc. Later, when he seemed to have collected all the British plants that he could, he made collections of sea and fresh-water shells and minerals.

In 1856 Ward withdrew entirely from business and gave himself up to the cultivation of rare plants and choice fruits in his garden. He was especially fond of saxifrages, alpine plants, and ferns. In 1863 Ward visited Ireland, traversing it from north to south, and east to west. In 1864 he paid a visit to Switzerland, during which he gathered sufficient plants to fill three large volumes.

In January, 1865, the Richmond and North Riding Naturalists' Field Club was started; Ward was one of the vice-presidents, and took the lead in the botanical department. He at once set to work to make a herbarium for the Club. In an incredibly short time he collected twelve large volumes of plants, numbering 2000 specimens, to remain for reference in the Club museum. He accompanied the Club on many botanical and geological rambles in the North Riding. He also joined the Tyneside Naturalists' Club.

When he reached the age of sixty-seven he began to be greatly troubled with rheumatism. He tried various baths and remedies without any permanent benefit. The disease seemed to be too deeply rooted in the joints to yield to treatment. In search of a milder climate he migrated, in 1871, to Redcliffe House, Barton-upon-Irwell, near Manchester. After two years of gradually declining health, he died on the 6th March, 1873, in the seventy-first year of his age, and was buried in the cemetery at Chester.

SHORT NOTES.

Bibliographical Note on Cape Plants. — I see that Mr. Bolus (*Orchids of Cape Peninsula*, p. 95 (1888)) speaks as if there were some doubt as to the authorship of certain papers on Cape Orchids which appeared in the *Journal of Science and the Arts*, 1818–20. It may be well to point out that the author has been clearly shown (in this Journal for 1884, pp. 145–6, and by Mr. J. J. Bennett (Preface to vol. ii. of Bot. Works of R. Brown, p. vi)) to be John Bellenden Ker, as Mr. Bolus infers. In the same article I have noted that Reichenbach refers the drawing of *Pterygodium catholicum* (quoted by Mr. Bolus under that species) to *P. cruciferum;* that of *Satyrium bracteatum* is referred by Reichenbach doubtfully to *S. striatum*. I note with some surprise that Mr. Bolus (*l. c.* 90) says that Bowie's "collections do not appear to have been numerous or important." The National Herbarium makes it evident that they were numerous, and I think those who have worked at them recognize their importance.—James Britten.

Euphrasia latifolia Pursh in Caithness. — I have found two small specimens of this plant among a gathering of *E. foulaensis* from low grassy cliffs between Thurso and Scrabster. It will probably prove to be generally distributed over the north coast of Scotland.—Edward S. Marshall.

Dianthus deltoides in Berkshire.—In the "Additions and Corrections" to the *Flora of Berkshire* I inserted *Dianthus deltoides* for the Isis district, on the authority of Miss Niven, "near Carswell." This record reached me through an indirect source, and I now find it refers to *D. Armeria*. Quite recently, however, I have seen a specimen of *D. deltoides* gathered just within Berkshire, near Wasing, on the Hampshire border. The plant was gathered by Mrs. Chorley, and I owe the information and inspection of the specimen to Miss Beales, who rediscovered *Herminium* in the county. —G. Claridge Druce.

Bromus interruptus in Hants.—This interesting grass was found by me on May 30, occurring very sparingly near Winchester in a field sown with *Lolium perenne*, with which it was probably introduced. I only saw two plants, but did not have an opportunity of thoroughly examining this and adjoining fields, or I might have found further specimens. It was easily recognizable at a considerable distance by the striking inflorescence. All doubt as to the plant's identity was set at rest by the presence of that peculiar distinguishing characteristic, *viz.* the split pale, and I may mention that Mr. Druce has seen a specimen. This grass has not, I believe, been previously noted for Hants, and its occurrence at Winchester considerably extends the range of this species. *Bromus interruptus* is now recorded for some half-dozen counties, and it seems likely that this number will be increased.—A. B. Jackson.

Carex stricta in Hants.—During a short stay at Winchester in May last, I collected an interesting sedge from a ditch in a water meadow bordering the Twyford road. It had a tussocky growth, and I felt much inclined to refer it to the above-mentioned species. Subsequently I gathered specimens with a similar facies in the Winnal meadows. Through the kindness of the Rev. E. S. Marshall I was able to submit plants from both localities to Herr Pfarrer Kükenthal, of Coburg, who says that all the material I sent him belongs to *C. stricta* Good. This is a new county record for the sedge, and its discovery in Hants is especially gratifying, bearing in mind the fact that in Mr. Townsend's Flora it is included among the list of remarkable absences.—A. B. JACKSON.

NEW PEMBROKE RECORDS. — During a few days' stay at Tenby I gathered the following plants not previously recorded for Pembroke:—*Sagina Reuteri* Boiss. Gravel walks.—*Trifolium striatum* L. Growing with *T. scabrum* on railway.—*Orchis latifolia* L. Penally. —*O. latifolia* × *maculata*. Penally.—*Koeleria cristata* Pers. Between Tenby and Penally.—RICHARD F. TOWNDROW.

LONICERA CAPRIFOLIUM IN PERTHSHIRE.—During a recent visit to Glen Farg, I found *Lonicera Caprifolium* L. in great abundance and in very fine flower. If we are to judge by the recent *Flora of Perthshire*, this is new to the county.—A. CRAIG CHRISTIE.

GALIUM VAILLANTII DC. IN OXON AND DORSET. — The Rev. E. S. Marshall has drawn my attention to a *Galium* we gathered together a few years back near Hamworthy Junction, Dorset, and on examination I see it is *G. Vaillantii*, as he suggested. This discovery led me to study again a plant I gathered near Oxford (Woodstock Road) in 1870, and named *G. Vaillantii*, but my mentor at that period called it *G. Aparine*, and it lay unthought of in my herbarium for many years under that name. It is, however, *G. Vaillantii*, and I think the species has not been reported for either county.— EDWARD F. LINTON.

BICHENO'S HERBARIUM. — James Ebenezer Bicheno's herbarium is now in the Swansea Museum. My friend the Rev. H. T. Riddelsdell has kindly copied the Berkshire localities for me. The specimens were collected between 1810 and 1830. The plants from Surrey include—*Mentha rubra*, Woking (I have not seen the specimen); *Hypochæris glabra* and *Arnoseris pusilla*, from Weybridge; *Alopecurus fulvus*, Whitmoor Pond, near Guildford; *Digitaria humifusa*, *Setaria viridis*, *S. glauca* (1842), *Festuca Myurus* (1843), all from Weybridge. There are probably others.—G. CLARIDGE DRUCE.

[Mr. Druce, in his *Flora of Berkshire* (pp. clii–clvi), gives an interesting sketch of Bicheno's work.—ED. JOURN. BOT.]

NOTICES OF BOOKS.

RECENT LITERATURE ON ALGÆ.

IN the *Annals of Botany*, March, 1898, Mr. A. H. Church publishes a paper on "The Polymorphy of *Cutleria multifida* Grev." He refers to the researches of Crouan, Reinke, and Falkenberg, and their experiments in the germination of the oospheres, confirming the results obtained by Prof. Falkenberg on the development of the *Aglaozonia*-thallus. It is an interesting point that Prof. Falkenberg's experiments of germination were made on fertilized oospheres, while Mr. Church's plants were the result of parthenogenesis. In each case a plant of the *Aglaozonia*-type was developed, showing the so-called "foot-embryo." From experiments in the germination of the spores of *Aglaozonia*, Mr. Church shows that these may give rise to a "protonematoid stage of *Cutleria*, which, on impoverishment and exposure in a sunny window in summer, became precociously antheridial"; or the *Aglaozonia*-form may again be developed. Attention is drawn to the fact that "polymorphy originates only in the embryonic history, leading to the formation of the embryo, designated the 'foot-embryo' and the 'protonematoid embryo' respectively"; and the author suggests that the cause of this polymorphy may possibly be found in the influence of environment. He then treats of the relation to temperature of *Cutleria* and *Aglaozonia* and their consequent geographical distribution. Finally, it is shown that if external conditions are not favourable for the fertilization of the oospheres of *Cutleria*, the plant is reproduced by parthenogenesis; and the advance of *Cutleria* into northern waters is accompanied by a diminution of the antheridia. The paper concludes with speculations on the phylogeny of *Cutleria*, in which comparisons are drawn between it and *Ectocarpus* and the *Tilopterideæ*.

In *Berichte d. deutsch. bot. Gesellschaft*, Jahrg. 16, Heft 3, Ap. 27, 1898, Dr. Kuckuck gives a short preliminary notice "On the copulation of swarmspores in *Scytosiphon*." He describes shortly his experiments with *S. lomentarius*, and figures different stages of the process. This takes place, however, in comparatively few cases, by far the greater number of spores coming to rest without copulation. Dr. Kuckuck promises further details shortly in *Beitr. z. Kenntn. d. Meeresalgen*.

Mr. Herman G. Simmons publishes a second number of his Algologiska Notiser in *Botaniska Notiser*, 1898, Hft. 3. This is entitled "Einige Algenfunde bei Dröbak," and forms an addition of twenty algæ to those already recorded from the Christiania-fiord by Prof. Gran. Among them is a specimen of *Phyllitis fascia* Kütz., which resembles in certain points *P. zosterifolia*, and appears to unite the two species. Mr. Simmons, however, wisely refrains from making it a new species, and leaves the record under *P. fascia*. A new *Monostroma*—*M. tenue*—is described and figured. It most nearly resembles *M. Lactuca*, from which it is distinguished "by its smallness, the form of the thallus, and the cell-structure." The first distinction can hardly be considered a good one, especially as no fruiting specimen has apparently been found, and the differences of the cell-structure might also be difficult to recognize.

Flora, Bd. 85, Heft ii. Ap. 23, 1898, contains a long and important communication by Mr. Mitzkewitsch "On Cell-division in *Spirogyra*." It embodies the result of nearly four years' investigation, and the author here collects together and amplifies the various short papers on the subject, published by him at intervals during this period.

ETHEL S. BARTON.

Fossil Plants for Students of Botany and Geology. By A. C. SEWARD, M.A., F.G.S., &c. With [111] illustrations. Vol. I. Cambridge: at the University Press. 1898. 8vo, pp. xviii, 452. Price 12s.

THE author has undertaken a serious task, which the volume before us shows him to have carried out so far with a remarkable degree of success. The work is not a Fossil Flora on the lines of Schimper's *Traité*, now nearly thirty years old. It is rather modelled on Schimper and Schenk's *Palæophytology* and Count Solms-Laubach's *Fossil Botany*. Mr. Seward presents his subject from the point of view of a botanist. He brings before the student the principal plant forms which have been detected in the earth's strata, and, after narrating the characters of the existing groups to which they belong or are related, he exhibits, often at considerable length, the points of affinity or of difference in the structure and organization of the recent and the fossil plants. The years that have elapsed since the works we have referred to were published have been years of activity in Palæo-botany, and Mr. Seward, having utilized the published material, as well as included the results of his own researches, has brought his work up to date.

In adding some critical remarks, it is not with the view of depreciating the value of Mr. Seward's work, but in the hope that a worker who is likely to add greatly to our knowledge of fossil plants may be induced to lay aside some secondary matters that affect the full value of his work. His language is often somewhat diffuse, and presents repetitions more suited to the lecture-hall than the study. The author cannot fail to rectify this in his second volume if he compresses the remaining groups into less than five hundred pages. Schimper and Schenk require a volume of over nine hundred pages for their exposition of fossil botany, and of these less than one hundred pages are occupied with the plants described by Mr. Seward in his first volume.

The author should give definite grounds for differing from previous authors whose names and views he sets aside. It is not sufficient, for example, in transferring a plant to the "non-committal term *Muscites*," which Schimper, as distinguished in Bryology as in Palæontology, had placed in *Sphagnum*, to say "the evidence is hardly strong enough to justify a generic designation which implies identity with a particular recent genus." The use of "non-committal" genera is a favourite device of the author, but where there are reasonable grounds justifying a definite determination it is a retrograde step to remove it, without reasons stated, to a more vague designation. On the other hand, the use of a "committal term" which does not include all the forms known to belong to that committal is very misleading. Schimper supplanted Brongniart's name of *Asterophyllites* by the new generic designation *Calamocladus*. All the species he included under the new name were species of *Asterophyllites*: his purpose was to show that they were the branchlets and foliage of *Calamites*. *Annularia* was retained as a separate genus of aquatic plants whose leaves floated on the surface of the water. Our knowledge of *Annularia* has somewhat advanced since Schimper's time. As Mr. Seward says, we now know that the vegetative branches possess the same type of structure as *Calamites*, and that the strobili are of the Calamostachys type. Nevertheless *Annularia* is retained as a distinct genus from *Calamocladus*.

Only confusion can come from such treatment of genera. But this is a necessary outcome of the author's view of nomenclature. He holds that in determining the name of a genus or species each student must choose for himself what course to follow in each case. It is therefore sufficient to decide which name shall be adopted that it appears to be "convenient," "more euphonious," or "non-committal." Endless confusion must follow such a practice. This it is the object of a right system of nomenclature to avoid. Botanists everywhere accept the Latin binominal introduced by Linnæus. In Russia or Japan, in Germany or England, the same double name is applied to the same species. This can be secured only by following some accepted system of nomenclature. Such a method has been formulated, and has been adopted by all systematic botanists, save a few cranks whose superior wisdom or profound ignorance leads them in other lines. We urgently commend the DeCandollean code to the consideration of Mr. Seward, with the conviction that it will give greater clearness to the presentment of his own views, and an easier apprehension of them by others.

W. C.

A Text-book of Botany. By Drs. E. Strasburger, F. Noll, H. Schenck, & A. F. W. Schimper. Translated from the German by H. C. Porter, Ph.D. 8vo, pp. 632, with 594 illustrations in part coloured. Macmillans: London & New York. 1898. Price 18s. net.

Messrs. Macmillan have been well advised to publish an English translation of a text-book of botany the usefulness of which in its original German form is shown by the fact that it has in less than four years reached a third edition. The most striking difference between the original and the translation is in the price, that of the former being 7.5 marks, that of the latter 18s., a remarkable difference which cannot be entirely accounted for by the plain green cloth covers which in the English form replace the paper ones of the German. The paper and printing of the original are quite equal to that of the translation, and the figures distinctly superior. Messrs. Macmillan presumably best know their own business, but we, in our ignorance, would have thought a book at two-thirds the price would have been a better commercial speculation, and from the students' point of view an indubitable advantage. Many, however, of those who can afford to pay the price will be glad to have the opportunity of reading in their mother tongue a text-book of botany which is in some respects unique. Morphology, physiology or the principles of classification, are each one man's work, and the subdivision of labour on these lines is the most important characteristic of the book. The name of Strasburger is a household word among botanical students; in the opinion of many, what was left undone by Sachs was done by Strasburger, and his name on the title-page will be a great attraction. He is responsible for the section on morphology, which is the best introduction to this branch of the science, or to botany as a whole, which could be put before an advanced student. The account, for instance, of the leaf (pp. 28, 29) is remarkably concise and free from technical terms, but nevertheless conveys just the right idea of what a leaf really is. The stelar hypothesis is lucidly explained and at sufficient length relative to its importance, but no mention is made of the polystely which has been found to exist in roots of certain palms. The references to phylogeny and ontogeny and the concluding paragraph on structural deviations, with the salutary warning against accepting malformations as evidence in morphology, are of interest, and help to vivify the oftentimes dry facts of form-study.

Dr. Noll's contribution, the section on Physiology, comes next, and is a very fair general account of the life-processes in plants and the relation between the individual and its inorganic environment. It leans rather to the biological than the chemical side, the latter being weak. The equation on page 200, which describes assimilation as the union of carbon dioxide and water to form starch with oxygen as a by-product, conveys an idea which is now known to be incorrect. The importance of sugars as a stage in assimilation is scarcely suggested till we come to the next stage, where it figures as a precursor of the proteids. The ascent of water in trees might have been treated at greater length, and in connection therewith is one of those mistakes which seem to be unavoidable: on p. 188 it is stated that "the sap of a *Begonia* ascends 60–100 metres"; the original reads *Wellingtonia*. Another instance occurs a little further on (p. 214): the "gall-wasp of the figure" refers to the Fig (*Ficus*), not a diagram.

The portion on Special Botany is the work of Dr. Schenck, who deals with Cryptogams, and Prof. Schimper, who does the Seed-plants. In view of their importance in phylogeny, and the facilities for their study, more space might have been given to the vascular cryptogams and we should have welcomed a wider reference to extinct forms, and the condition of the group in past ages. Prof. Schimper supplies an account of the principal families of seed-plants, which is clear and well arranged on the usual lines. It is based on Eichler's system, which approaches more nearly to a natural arrangement than the one generally adopted in English text-books. A chapter on plant-geography would have been a useful addition, and we should have been glad to see more about the distribution of plants in space in the accounts of the individual families. As in the original, some poisonous species are honoured with coloured figures. The selection is somewhat arbitrary, and the pictures are not by any means a success.

A. B. Rendle.

Rabenhorst's Kryptogamen-Flora von Deutschland, Oesterreich und der Schweiz. Second ed. Vol. v. The Characeæ, by Dr. W. Migula. Large 8vo. Illustrated by woodcuts. In twelve numbers. Leipzig, 1890–7. Price 28 marks 80 pf.

Synopsis Characearum Europæarum. By the same Author. Large 8vo, 176 pages. Woodcuts. Leipzig, 1898. Price 8 marks.

The first of these books is the most voluminous work on the *Characeæ* which has yet appeared, consisting of 778 pages, with 149 illustrations. The earlier portion is devoted to an account of the morphology, position, and distribution of the *Characeæ*, with a rather indiscriminate and not very accurate bibliography. The remainder consists of an extremely elaborate description of the *Characeæ* of Europe, with figures of nearly all the species and many of the varieties. To give some idea of the extent and minuteness of the work, it may be mentioned that *Chara fœtida* alone occupies fifty-five pages and has seventy named forms or varieties, *C. aspera* and *C. fragilis* following with forty and thirty-seven varieties respectively, while *C. crinita*, *C. ceratophylla*, *C. intermedia*, and *C. contraria* each rejoice in more than twenty! In a monograph it is certainly desirable to indicate the extent and directions of the variation in each species, and to characterize the well-marked varieties; but we do not think any useful end is served, especially in dealing with a group of aquatic plants, the vegetative parts of which are subject to great variation, by describing minutely every form of which the author has seen a specimen. In the present work a large number of the varieties are recorded from single localities, and it is fair to suppose in these cases that the descriptions are often drawn up from single specimens. The effect of this redundancy of varieties is to make the book needlessly cumbrous, and one cannot help feeling that an immense amount of energy and labour has been expended with but little practical result.

The arrangement followed by Dr. Migula is that in Braun's *Fragmente*, except that the anomalous *Lychnothamnus stelliger* Braun, which has had so many vicissitudes as regards name and position, is made to constitute a new genus—*Tolypellopsis* Migula (*Chara* sect. *Tolypellopsis* Leonh.); and *C. rudis*, *C. horrida*, *C. crassicaulis*, and *C. delicatula*, which Braun regarded as subspecies, are here treated as full species. In nomenclature also Dr. Migula has closely followed Braun, repeating his eccentricities. For instance, he retains the name *C. coronata* with the unsatisfactory citation "*C. coronata* Ziz. ined. (nach Braun circa annum 1814)" so as to antedate the unimpeachable name *C. Braunii* Gmelin (1826). Again, *C. contraria* is cited as of "A. Braun in Schweizer Char. (1847)," actually followed a little lower down by a quotation of "Kützing Phyc. german. (1845)." We might multiply instances of this kind, but these will suffice to show how all rules of nomenclature are set at naught. In the table of distribution of the *Characeæ* in Europe we notice that Great Britain is not credited with *C. coronata*, *C. ceratophylla*, *C. contraria*, or *C. intermedia*.

The illustrations are, with one exception, original, and, though some of them are somewhat crude and inartistic, they give a very good idea of the plants. Several of the species, especially as regards the magnified parts, are much more fully illustrated than in any previous book. *Lamprothamnus Hausenii* is, we believe, figured for the first time. Altogether the book is a valuable addition to *Chara*-literature, and will be of great use to those working specially at the order.

The *Synopsis Characearum Europæarum* is an abridgment of the foregoing work, and is much more convenient and get-at-able, containing almost all the illustrations of the larger book, with the letterpress much condensed. The specific descriptions, though considerably shorter, will still, we think, be found sufficient for all practical purposes. The descriptions of the multitudinous varieties are in most cases reduced to a few lines.

H. & J. Groves.

Illustrated Guide to the Royal Gardens, Kew. Edited by Mrs. S. Goldney. London: Dawbarn & Ward [no date]. Price 1s. net.

We do not know whether a remark we made (p. 35) in noticing what is practically an earlier issue of this little book suggested its appearance in its present form; but in any case it to some extent remedies the manifest inconvenience caused by the long-continued absence of any official Guide to Kew Gardens. The "poetry" contributed by Mrs. Goldney to the former work is here replaced by undoubted prose, written, it would seem from the use of the male pronoun, by some man who desires to remain anonymous, and edited, as we are told, by Mrs. Goldney.

The information contained in the *Guide* is so "miscellaneous" that it might be worth while for the Kew authorities to include it in the "additional series" of the *Bulletin.* We learn that "plants are sent [to Museum No. 17] from all parts of the world, for the purpose of being identified and placed in their proper class"; but as in the Herbarium "names are assigned to the dried plants which arrive from foreign countries," it would seem that an economy of labour might be effected by a union of these two establishments. A window in the Museum traces "the career of the Cotton Plant, from the period of sowing until it reaches the goal of its ambition—the covering of the human frame." Ambition, though a well-known characteristic of the Snark, seems to us new in the cotton plant. "On the second floor we find Sir Joseph Banks, who collected rare plants from all parts of the world, and enriched the Kew Museums (!) and Houses with them, notably the Fuchsia and Hydrangea. Near his bust we find a picture of Captain Cook. Sir Joseph Banks sailed with him to the Pacific, as Botanist, and the two friends largely added to Mr. Aiton's Catalogue of Plants." If the *Guide* has derived the advantage of Mrs. Goldney's editing, the work as it left the writer's hands must have been curious reading.

The title-page tells us that the *Guide* is "illustrated from photographs taken expressly for this work"; but they are the same as appeared in the other work. Any way they are well worth the shilling demanded for the book.

A Manual of Agricultural Botany. From the German of Dr. A. B. Frank, Professor in the Royal Agricultural College, Berlin. Translated by John W. Paterson, Ph.D., &c., Lecturer in Agricultural Chemistry at the Glasgow and West of Scotland Technical College, Glasgow. Edinburgh and London: W. Blackwood and Sons. 8vo, pp. x, 199. Price 3s. 6d. 1898.

That Professor Frank could write a good book for agricultural students no one doubted. His extensive knowledge, his ample opportunities, his position as a teacher, and his remarkable collections of cultivated plants, in health and disease, fitted him for such a work. That he has produced a Manual of Agricultural Botany is a great gain in this important aspect of applied science. And that it has been carefully and clearly translated, and issued, fully illustrated, at a low price, must be a boon to students in this country and America. The Manual consists of a systematic portion occupying the first half of the volume, in which the characters of the principal groups are well presented; while the Orders that possess more importance to the agriculturist are more fully treated. The remainder of the volume is devoted to anatomy and physiology, these subjects being treated concurrently, greatly to the interest and the instruction of the student. Everywhere a keen eye is kept by Prof. Frank on those points which are of practical importance to the grower of crops of any kind. If farmers would master the volume—and it would repay them though months were given to the task—they would have a deeper and more intelligent interest in their daily work. A few pages are devoted to the diseases of plants.

W. C.

Aide-mémoire de Botanique générale, anatomie et physiologie végétales. Par le Professeur Henri Girard. 1 vol in-18 de 358 pages, avec 77 figures, cartonné. Paris: Baillière et fils. Price 3 fr. 1897.

This little book is the ninth of a series of ten natural history manuals compiled by Professor Girard with the object of enabling candidates for examination in the natural sciences to review in a very short time the various questions which might be put before them. The author has included, with the utmost brevity compatible with the omission of nothing, the subjects of the most recent syllabuses. In plain English, he has produced a series of cram-books, which will doubtless have a large sale, and be as commercially profitable to the author and publisher as they will be morally and scientifically injurious to the examinee. Revision of work is necessary on the eve of an examination, but it should be a revision of notes taken by the student himself, supplemented by his drawings of apparatus or the preparations he has made in his practical work. Such a review will bring back by a natural process much of what he has learnt far better than by grinding through the pages of a book like the one before us, embellished with a few indifferent figures. We trust that no one will translate it into English.

A. B. R.

*ARTICLES IN JOURNALS.**

Annals of Botany (June).—D. S. Johnson, 'Development of leaf and sporocarp in *Marsilia quadrifolia*' (3 pl.).—J. Parkin, 'Histology of Monocotyledons' (1 pl.). — P. Magnus, '*Æcidium graveolens*' (1 pl.). — R. H. Biffen, 'Coagulation of Latex.' — R. W. Phillips, 'Development of cystocarp in Rhodymeniales: II. *Delesseriaceæ*' (2 pl.). — W. C. Worsdell, 'Vascular structure of sporophylls of *Cycadaceæ*' (2 pl.).—C. Reid, 'Geological history of British Flora.' —W. H. Lang, 'Apogamy and development of sporangia on fern-prothalli.'—A. J. Maslen, 'The ligule in *Lepidostrobus*.'

Bot. Centralblatt (Nos. 24–26). — B. Lioforss, 'Ueber einige Inhaltskörper bei *Potamogeton prælongus*.'—(Nos. 24, 25). F. W. E. Roth, 'Hieronymus Bock, genannt Tragus (1498–1554).'—(No. 26). H. O. Juel, 'Parthenogenesis bei *Antennaria alpina*.'

Bot. Gazette (16 May).—C. MacMillan, 'Orientation of the plant egg and its ecological significance.'—W. R. Smith, 'Life-history of *Pontederiaceæ*' (2 pl.). — C. D. Beadle, 'Botany of South-eastern States.'

Bot. Notiser (23 May). — L. G. Laurell, 'Anmärkningsvärdare fanerogamer och kärlkryptogamer inom Sorunda pastoratsområde af Södertörn uti Södermanland.' — M. Heeg, 'Ueber einige Arten der Gattung *Riccia*.'—H. G. Simmons, 'Einige Algenfunde bei Dröbak.' — O. Nordstedt, 'Några ord om Nymphæaceernas utbredning i Skandinavien samt om preparering af Nymphæa-blommor för herbariet.' — S. Berggren, 'Om *Rhynchospora alba* och några audra svenska Cyperaceers morfologi' (1 pl.). — Id., 'Det uppsvällda internodiet hos *Molinia cærulea*.' — C. J. Lindberg, 'Studier öfver skandinaviska fanerogamer' (*Glyceria*, three new species; *Poa Blytti*, sp. n.; *Phippsia; Atriplices*).

Bot. Zeitung (16 May). — W. Benecke, 'Ueber Culturbedingungen einiger Algen.'

Bull. de l'Herb. Boissier (June). — G. Gaïllard, 'Roses du Jura.' —P. Culmann, 'Flore bryologique suisse.'—R. Chodat, 'Les algues perforantes d'eau douce'; 'Les galets sculptés du rivage des lacs jurassiques' (2 pl.); 'Les algues littorales du lac Léman.' — C. de Candolle, 'Piperaceæ Sodiroanæ.' — J. Briquet, 'Les hydathodes foliaires des *Scolopia*.' — A. Pestalozzi, 'Die Gattung *Boscia* Lam.'

Bull. Soc. Bot. France (xliv: Session extraordinaire à Barcelonnette, 1897). — L. Legre, 'La Botanique en Provence au xvi siècle; Mathias de Lobel et Pierre Pena.' — L. Lutz, 'Gomme de Canna'; A. Lombard-Dumas, 'Bernardin Martin' (1813–1897); G. Barratte, 'Napoléon Doumet-Adanson' (1834–1897).

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* The dates assigned to the numbers are those which appear on their covers or title-pages, but it must not always be inferred that this is the actual date of publication.

Bull. Torrey Club (8 June). — G. V. Nash, 'The genus *Syntherisma* [*Digitaria*] in N. America.'—E. O. Wooton, 'New plants from New Mexico.' — W. W. Rowlee & M. W. Doherty, 'Histology of embryo of Indian Corn' (1 pl.).—J. K. Small, 'N. American plants.' —C. H. Peck, 'New Fungi.'—B. D. Halsted, 'Mycological Notes.' — L. Radlkofer, 'New *Sapindaceæ*.' — A. A. Eaton, *Spartina cæspitosa*, *Eriophorum paucinervium*, spp. nn. — E. J. Hill, '*Vitis Labrusca*.'

Gardeners' Chronicle (4 June). — 'Papery-spined Opuntias' (fig. 129).—W. B. Hemsley, 'Sydenham Teaste Edwards.'—(11 June). *Senecio Hanburianus* Dinter, sp. n.—*Tagetes lacera* (fig. 135).—*Aceras Bolleana* Siehe & Hausskn., sp. n. (fig. 138). — (18 June). R. A. Rolfe, '*Nepenthes ventricosa*' (fig. 143).

Journal de Botanique (16 April). — J. Nadeaud, 'Les Composées arborescentes de Tahiti.' — R. Chodat & A. M. Boubier, 'Sur la plasmolyse et la membrane plasmique.'

Oesterr. Bot. Zeitschrift (June). — T. Wulff, 'Studien über verstopfte Spaltöffnungen' (1 pl.). — F. Buchenau, '*Luzula campestris* und verwandte Arten.' — E. Woloszczak, 'Salices hybridæ.' — J. Freyn, 'Zur Flora von Ober-Steiermark.' — V. v. Cypers, 'Zur Flora des Riesengebirges.'

BOOK-NOTES, NEWS, &c.

At a public meeting of friends of Sir George King, K.C.I.E., F.R.S., and Dr. D. D. Cunningham, C.I.E., F.R.S., held on April 5, in the rooms of the Asiatic Society of Bengal, it was resolved to commemorate the scientific labours and official careers of these gentlemen in India by a permanent memorial in the form of medallion portraits of both, to be placed in the Zoological Gardens, with replicas of these portraits in the Asiatic Society's rooms, and, should the funds admit, of a similar portrait of Sir George King in the Royal Botanic Garden. J. O'B. Saunders, Esq., 9, Hare Street, Calcutta, has undertaken to act as Honorary Treasurer.

One of the more recent contributors to North American systematic botany, Mr. Aven Nelson, has ingeniously introduced a new mode of citing an author's name. In the *Botanical Gazette* (March & April) he abbreviates his own name as "Aven N." Mr. Nelson does not even boast a hyphen in partial justification of this method: so that, were it not for the restraining influence of British common sense, we might at any time find "Botting H." or "Claridge D." as the authority for a species. Mr. Nelson, however, is not restricted to one mode of citation, for in the May *Torrey Bulletin* he appends "A. Nelson" to his species.

"Of making of books there is no end." The *Bulletin of Miscellaneous Information* has started an "Additional Series," the first number of which contains the "Report on the Economic Resources of the West Indies," by Dr. Morris, which was appended to the report of the West India Commission issued last year. It is edited by Dr. Dyer, who says that "the opportunity has been taken to carefully revise it." There is room, however, for further revision—*e. g.* we note that Macfadyen's name is always misspelt. The "additional series" follows in the wake of its predecessor in the matter of dates: the Stationery Office date is "11/97"; the title and cover bear "1898"; the preface is dated "January, 1898"; and the book actually appeared in May.

Prof. Archevalata publishes in the Anales del Museo nacional de Montevideo (vol. ii. part 8) the first instalment of a *Flora Uruguaya.* It is descriptive, and contains the families *Ranunculaceæ* to part of *Cruciferæ.* Cultivated plants, such as *Mathiola incana* and *Cheiranthus Cheiri,* are included. Prof. Archevalata follows Dr. Kunze in adopting the name *Clematitis* in place of *Clematis,* but with this exception the nomenclature presents no remarkable features. The work is written in Spanish throughout, and is expected to extend to two volumes, each of about 600 or 700 pages. No new species are described so far.

At the Anniversary Meeting of the Linnean Society on May 24th, a special gold medal was presented to Sir Joseph Dalton Hooker on the occasion of the completion of *The Flora of British India,* in recognition of the eminent services rendered by him to science during sixty years of unremitting labour. In acknowledging the presentation, Sir Joseph thanked the President of the Society, Dr. Günther, for having coupled his father's name with his own in making the award, and added :—"I inherited from him my love of knowledge for its own sake, but this would have availed me little were it not for the guiding hand of one who had himself attained scientific eminence ; who, by example, precept and encouragement, kept me to the paths which I should follow ; launched me in the fields of exploration and research, liberally aided me during his lifetime, and paved for me the way to the position he so long held at Kew with so great credit to himself, and benefit especially to our Indian and Colonial possessions." The gold medal of the Society was awarded to Surgeon-Major George Charles Wallace, M.D., in recognition of his researches into the problems connected with bathybial and pelagic life.

At a meeting of the Linnean Society on June 2nd, Mr. E. S. Salmon read a paper entitled "A Revision of the Genus *Symblepharis.*" This genus of Mosses, he said, as founded by Montagne in 1839, had proved too narrow, through the limits imposed by certain peristome characters, and he was of opinion that Mitten's later emended description should be accepted. Montagne had founded the genus for the Mexican *S. helicophylla,* and to this species Mr. Salmon would refer the Indian moss *S. himalayanum* Mitten (*Didymodon vaginatum* Hook.), as well as *S. Chrismari* C. Müll. and *S. asiatica* Besch., which were found not to possess the characters by which they had been separated from *S. helicophylla* Mont. *S. microcarpa* C. Müll. he considered to be a variety of *S. helicophylla* Mont., and two new varieties of that species were described—vars. *tenuis* and *macrospora*—the latter remarkable for its large spores, 35–45 μ. In the course of his remarks on other species of the genus, Mr. Salmon observed that *S. fragilis* Mitt. is peculiar in the bistratose structure of the leaf, and *S. socotrana* Mitt. (doubtfully included in the genus in the absence of fruit), in the papillose cells. *S. circinata* Besch. and *S. usambarica* Broth. he would exclude from the genus, and pointed out that the former species, from Grande Comore and La Réunion, comprises two distinct mosses. Mr. C. B. Clarke gave a summary of a paper "On the Subdivision of Biological Areas in India," and in the course of his remarks mentioned some interesting facts in connection with plant distribution in the Indo-Oriental Region. Dr. Stapf, in commenting on the paper, expressed the opinion that the limits of the subdivisions proposed were natural, and might well be accepted by botanists.

Mr. A. Somerville sends us a nicely printed sheet from which may be seen at a glance the *County and Vice-County Divisions of the British Isles* (for biological purposes), in accordance with *Topographical Botany* for England and Scotland, and for Ireland with Mr. Praeger's divisions as published in this Journal for February, 1896. Mr. Somerville adds some useful notes on the divisions. Copies may be had post-free in millboard tube from A. C. Burns, 383, Sauchiehall Street, Glasgow, for 4d.

Mr. J. B. Carruthers has issued an interesting and important preliminary report on the Cocoa disease, which, at the invitation of the Planters' Association, he has been studying in Ceylon. This report gives the results of his observations on diseased trees, and of his culture and inoculation experiments: although their life-history is not yet fully worked out, he has thrown considerable light on the nature of the fungi causing the Cocoa disease. There seem to be two distinct vegetable parasites which attack the Cocoa plant. One is a fungus which attacks the pods and plays immense havoc, for by its means alone nearly fifty per cent. of the crop is destroyed or reduced very much in value: Mr. Carruthers has succeeded in cultivating this fungus and in discovering its reproductive bodies, proving by this means that it belongs to the group typified by the well-known Potato disease. Successful inoculation with this fungus was made from one pod to another. The other fungus attacks the stems, producing canker: in this also reproductive bodies (spores) were discovered, and successful inoculation experiments made. As one would expect, moisture is most essential for the growth of both these fungi, as is shown by the fact that to obtain successful inoculation results in dry weather artificial moisture must be supplied; this suggests that, as far as the canker is concerned, shading should be reduced as much as possible. Although this report is only preliminary, Mr. Carruthers shows clearly that the first step has been made towards combatting the Cocoa disease;

with a full and complete knowledge of the life-history of the parasites producing the diseased condition, its prevention and cure will, it is hoped, be an easy matter. The *Ceylon Observer* of May 24 speaks in very complimentary terms of Mr. Carruthers's work.

We are glad to note that the examiners in botany at the London University have recommended Mr. A. B. Rendle for the degree of Doctor of Science.

Mr. E. D. Marquand publishes in the *Transactions of the Guernsey Society of Natural Science* for 1897 an enumeration of "The Fungi of Guernsey." The list contains 456 species, two of which—*Clitopilus sarnicus* and *Verticillium Marquandii*—are new to science. These are named by Mr. Massee, to whom "every specimen" in the list has been submitted: unfortunately only the names of these two novelties are published, without any diagnosis.

A work will shortly be published by Messrs. Chapman & Hall entitled *Medical Works of the Fourteenth Century*. It consists of transcripts of four MSS.—three in the British Museum and one in the possession of the editor, the Rev. Professor Henslow. These MSS. are apparently miscellaneous collections of prescriptions, including charms, etc., and illustrate the crude ideas of medicine and surgery in the middle ages. The composition of drugs is often remarkable for the number of plants used—from twenty to fifty being not uncommonly employed in the same remedy. Mr. Henslow has received help from Prof. Skeat, who has contributed notes to the work.

The "March" number of the Kew *Bulletin* (published in May) contains a list (by Mr. J. M. Wood) of plants and fruits used by natives of the Ubombo district of Zululand as food during times of scarcity. The new number (the sixth) of the *Journal of the Kew Guild* has a pleasant portrait of Prof. Daniel Oliver, accompanied by a short biographical sketch by Mr. Hemsley.

Messrs. Colman have issued an advertisement card containing small coloured figures of nearly a hundred British plants. Although some of the figures—*e. g.* that of lucerne—are far from accurate, the plants as a whole are fairly recognizable, and teachers in elementary schools might do worse than obtain a copy, though by so doing they will of course be advertising the various wares of the proprietors. But it is fair to add that, as things go, the advertisement is unobtrusive.

Mr. George Allen has issued a pretty little book of plant-gossip under the title of *Flower Favourites*, by Lizzie Deas (sm. 8vo, pp. 229, price 3s. 6d. net). The author deals with the "legends, symbolism, and significance" of flowers, in the manner familiar to readers and compilers of this kind of book. She quotes as authentic Forster's spurious antique which figures in every popular work dealing with flower-lore, and "old legends," whose age is at least doubtful. Nor is her botany beyond reproach; *e. g.* she speaks of the "red-blossomed sweet-scented *clematis flammula*" (p. 145). The author seems to have hopelessly confused lucerne and saintfoin; with regard to the latter name she quotes a ridiculous passage from Mr. Hilderic Friend—"who the saint intended, or what the reason for ascribing divine honours (!) to the plant, does not appear": the "early Christian tradition" which Miss Deas cites in connection with *Onobrychis* is, we believe, of extremely modern growth, as are far too many of the stories in this and other books like it, for which an imaginary antiquity is claimed. The popular rhyme on the daffodil is turned into nonsense by an alteration which speaks of "a yellow petticoat and a *red* gown"; and the derivations are often absurd, and show want of acquaintance both with plant and legend, as when "bloody man's fingers" is referred to the *berries* of Arum. There are ridiculous misprints—*e. g.* "the name myrtle signifies sweet *puce*" (p. 199). The book, in fact, is a worthy companion to the Rev. T. F. Thiselton Dyer's *Folk-lore of Plants*, noticed in this Journal for 1889 (p. 122); but Miss Deas has not 'cribbed' in so barefaced a manner as her reverend predecessor.

Dr. Saint-Lager sends us his *Notice sur Alexis Jordan* (1814–1897), of which, should our space allow, we hope to give an abstract later. An excellent portrait accompanies the memoir.

Dr. G. Beauvisage has lately published (Ann. Soc. Bot. Lyon, xxii.) a notice, accompanied by a portrait, of the Rev. Xavier Montrouzier, Marist missionary, who died at Saint Louis, Nomnea, New Caledonia, on May 16, 1897, at the age of seventy-six. Montrouzier botanized in Australia in 1845 and 1852; in 1857 he collected in the Island of Art, New Caledonia, and published a paper on his collections in the Memoirs of the Lyons Académie des Sciences. Pancher named in his honour the genus *Montrouziera*.

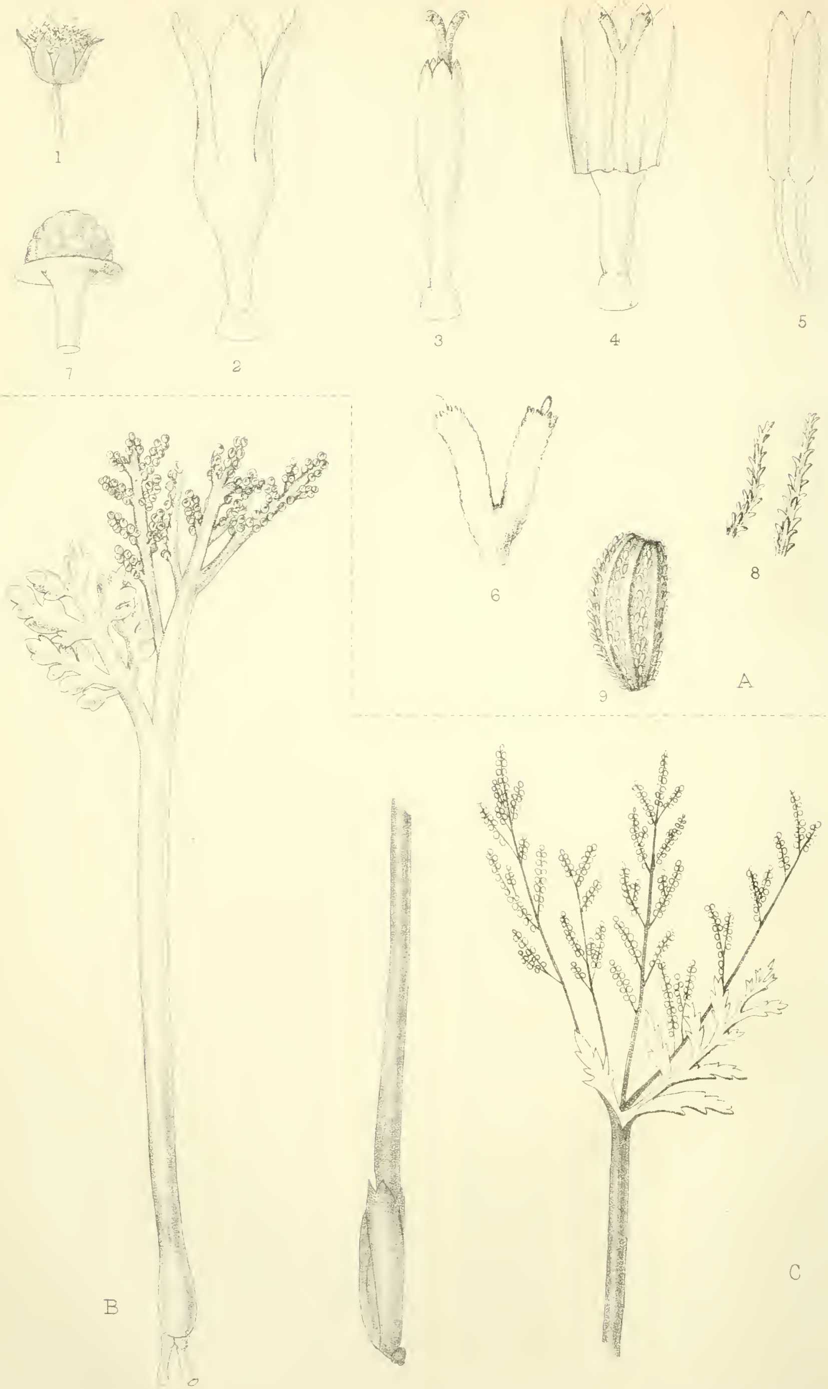
Johan Martin Christian Lange, whose name is familiar to all European botanists in connection with the *Flora Danica* and the *Prodromus Floræ Hispanicæ*, died on the 3rd of April, at the age of eighty.

We have received, too late for notice in this number, the first instalment of Messrs. Fryer and Morgan's important monograph of *The Potamogetons of the British Isles*. This includes twelve admirable quarto plates and twenty-four pages of letterpress, and costs 15s. uncoloured, 21s. coloured, net. Messrs. Lovell Reeve & Co. are the publishers.

We are glad to learn that the printing of the third and concluding volume of Dr. Britton's *Illustrated Flora of the Northern United States* has been completed, and that it will be published immediately.

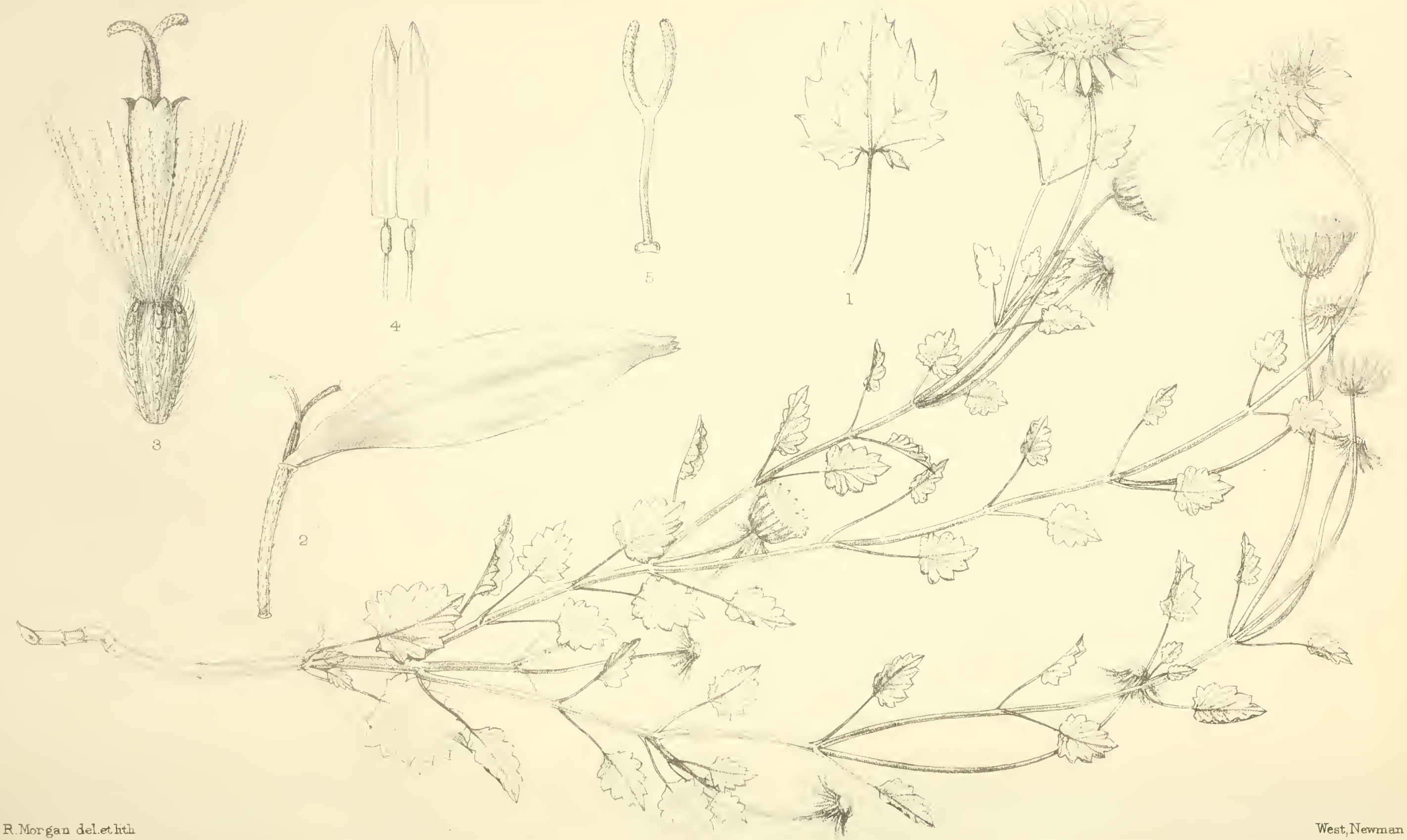
A *Flora of Co. Donegal*, by Mr. H. C. Hart, is announced for immediate publication by Messrs. Sealy, of Dublin.

We learn from a correspondent that Dr. Francis Bossey, whom we placed (p. 145) in our supplemental list of deceased botanists, is still alive, and about ninety years old.



R Morgan del et lith.
West, Newman imp

A. Psednotrichia tenella *Hiern.* B. Botrychium matricariæfolium *A Br.*
C. B. lanceolatum *Angstr. (after Newman.)*



R. Morgan del. et lith. West, Newman imp.

Adenogonum decumbens *Welw.*

TWO NEW GENERA OF COMPOSITÆ.

By W. P. Hiern, M.A., F.L.S.

(Plates 388 a, 389.)

The plants here dealt with form part of Welwitsch's African collection; they were obtained in Benguella in 1859–60. The determinations are taken from the forthcoming part of the Welwitsch Catalogue, which to this extent is thus anticipated, so as to secure early publication and to take advantage of the accompaniments of the plates here afforded.

The material at hand for the former of the two genera is somewhat fragmentary, and very small in bulk; indeed, though the plant does not exceed 4 in. in length, the specimens do not give any adequate idea of the plant as a whole; fortunately, Welwitsch's notes enable some account to be given of the plant as it appeared to him, including the colour of the florets, and complete heads of flowers were preserved for examination; thus all the characters essential for the establishment of the genus have been ascertained.

The material for the other genus is ample, and the difficulty with it is to assign it to its tribe in the order; on this point Welwitsch noted as follows:—Habit of *Cineraria*, but the style and opposite leaves keep it out from this genus and from *Senecio;* the elongated style-branches and the opposite leaves, also the large long flower-rays, somewhat correspond with *Arnica*, a genus, however, which belongs to the northern hemisphere, though *A. tabularis* Thunb. (*Alciope tabularis* DC.) more or less agrees, except for the alternate leaves and the absence of the rows of the remarkable oil-glands from the achenes of the latter; the style-branches are nearly those of the tribes *Vernoniaceæ* or *Eupatoriaceæ*, and in this respect it may be remembered that De Candolle and Endlicher placed *Alciope* in *Eupatoriaceæ*, that Lessing placed it in *Senecionideæ*, and Harvey in *Asteroideæ; Adenogonum* fluctuates between *Asteroideæ* and *Senecionideæ*.

Psednotrichia, gen. nov.

Capitula homogama, discoidea, multiflora; floribus omnibus hermaphroditis, fertilibus, tubulosis. Involucrum cum alabastris subglobosum, cum floribus vel fructibus campanulato-hemisphæricum; bracteis subuniserialibus, subæqualibus, siccis, margine anguste membranaceis; receptaculo nudo, hemisphærico, demum foveolato-areolato. Corolla regularis, semi- vel brevi-quinquefida. Antheræ inclusæ vel vix cum corollæ lobis æquatæ, apice in appendicibus lanceolatis brevibus productæ, basi obtusæ ecaudatæ integræ. Styli rami breves, recti vel leviter curvi, compressiusculi, non attenuati, obtusissimi, cum appendiculo deltoideo-lanceolato vel lanceolato-subulato deciduo mucronulati, in corollæ tubo plus minus inclusi, longiores vel cum andrœcio æquati. Achænium oblongum vel obovoideo-oblongum, parum compressiusculum, costis vel angulis 5 longitudinalibus atque glandulorum breviorum pallidorum plus minus deciduorum in intervallis positis seriebus. Pappus

uniserialis, setosus, citissime caducus; setis pluribus, subæqualibus, ovario longioribus, rectis vel sæpe flexis, albidis, argute setulosis, setulis erecto- patentibus.

Herba annua subglabra pumila; cauliculis abbreviatis; foliis radicalibus, filiformibus, linearibus, erectis; scapis digitalibus, aggregatis, tenuibus; capitulis croceis.

P. tenella, sp. unica. Herba fragilis, 3–4-pollicaris; scapis bracteatis, divisis, glabratis; bracteis lanceolatis, parvulis, sessilibus amplectentibus, interdum ternatis; capitulis circiter 30-floris, $\frac{1}{8}$–$\frac{1}{4}$ poll. diam.; involucri bracteis sæpius 8, lanceolato-oblongis, $\frac{1}{8}$–$\frac{1}{6}$ poll. longis, apice acuminatis, parallele pauci-nervosis, glabriusculis, dorso minute glandulosis; floribus $\frac{1}{8}$ poll. vel paulum longioribus; corollæ $\frac{1}{12}$ poll. longæ tubo subtus angustato, super (interdum abrupte) dilatato, lobis lanceolatis oblongisve, apicibus incrassatis exceptis tenuibus; achænio $\frac{1}{20}$ poll. longo fuscescente, recto vel curvo, apice in annulo tenui subangulato cartilagineo terminante; receptaculo fructifero $\frac{1}{24}$ poll. diam.

Habitat in distr. Huilla, ad Humpata in pascuis; cum fl. et fr., Aprili 1860; legit *Fr. Welwitsch*, Coll. Carp. 690.

This belongs to the tribe *Asteroideæ*, subtribe *Homochromeæ*. There are two kinds of flower, slightly differing, one with a less deeply divided corolla than in the other, and with the longer kind of andrœcium accompanied by the shorter kind of style. The generic name is derived from ψεδνός, *rubbed off*, and θρίξ, τριχός, *hair*, with reference to the very early shedding of the pappus.

Adenogonum Welw. MS. in herb., gen. nov.

Capitula heterogama longe radiata homochroma multiflora; floribus ligulatis exterioribus uniserialibus fœmineis fertilibus, ligulis conspicuis apice tridentatis; floribus tubulosis interioribus pluriserialibus hermaphroditis fertilibus pentameris. Involucrum subhemisphæricum; bracteis pluriseriailbus, imbricatis, inæqualibus, demum patentibus vel reflexis, interioribus sublinearibus, acutis, siccis, rigidis, margine scariosis, quam exteriores gradatim angustiores minus rigidæ longioribus. Receptaculum nudum demum planiusculo-convexum. Antheræ inclusæ, apice in appendicibus lanceolatis productæ, basi obtusæ ecaudatæ; filamentis prope apicem glandula ceracea aurantiaca auctis. Styli exserti rami elongati, anguste subclavato-incrassati, dense puberuli, arcuato-incurvi, apice obtusi minute apiculati; styli basi (nectario) bulbosâ. Achænium obovoideum, compressiusculum, pilosum, secus margines mediamque faciem vel medias facies longitudinaliter costatum; costis glandorum majusculorum oleosorum serie utrinsecus intra margines et secus medium tuberculatis. Pappus pauciserialis, setosus, persistens; setis rectis, rigidulis, interioribus subrobustis scabridis inæquilongis pallide stramineis, exterioribus brevibus sæpe parum evolutis pallidioribus planioribus tenuioribus margine subciliatis.

Herba rigida; foliis oppositis vel rarius superioribus alternis, ovatis, dentatis; capitulis terminalibus subterminalibusque, pedunculatis, mediocribus; floribus lætissime flavis.

A. decumbens Welw. MS. in herb., sp. unica. Herba ut videtur annua, glabriuscula, nitidula, eximie decorans, habitu *Cinerariæ;* caulibus a basi ramosissimis, decumbentibus, demum ramulisque ascendentibus, teretibus, rigidis, subgracilibus, foliosis, basi fere lignosis; foliis ovato-cordiformibus, firme membranaceis, in vivo lucido-viridibus, $\frac{3}{8}$–1 poll. longis, $\frac{1}{3}$–$\frac{3}{4}$ poll. latis, dentatis, dentibus ovato-deltoideis acutis; petiolo $\frac{3}{8}$–$\frac{5}{8}$ poll. longo, basi subamplexicauli non vel anguste decurrente, patulo; capitulis circa $\frac{3}{4}$ poll. diam., sub-30-floris, pedunculo nudo, $\frac{1}{2}$–3 poll. longo suffultis; involucri bracteis interioribus $\frac{1}{3}$–$\frac{3}{8}$ poll. longis margine ciliolatis vel minute fimbriatis, extimis parvis mox recurvis; ligulis subscarioso-persistentibus, $\frac{1}{2}$ poll. longis, $\frac{1}{8}$ poll. latis, subcymbiformibus; florum discoideorum corollâ $\frac{1}{4}$ poll. longâ, tubo pilosulo, lobis ovato-deltoideis reflexis; antheris $\frac{1}{8}$ poll. longis; stylo $\frac{1}{3}$ poll. longo, ramis $\frac{1}{8}$–$\frac{1}{6}$ poll. longis; achænio $\frac{1}{8}$–$\frac{1}{6}$ poll. longo; pappo $\frac{1}{5}$–$\frac{1}{4}$ poll. longo; receptaculo $\frac{1}{8}$ poll. diam., fructifero punctis elevatis notato.

Habitat in distr. Mossamedes, non frequens ad rupes gneissicas juxta ripas superiores fluminis Bero; cum fl. et fr., Julio 1859; legit *Fr. Welwitsch*, No. 3999.

This plant does not fully accord with any of the recognized tribes of *Compositæ;* I regard it as an aberrant *Senecionidea*, and amongst African genera place it next before *Gongrothamnus*. Welwitsch, doubtless, derived the name of his genus from ἀδὴν, *a gland*, and γωνία, *an angle*, in allusion to the rows of conspicuous oil-glands on or along the ribs of the achenes.

Explanation of Plate 388 a. — *Psednotrichia tenella*. Fig. 1. Capitulum. 2. Corolla. 3. Andrœcium, with the upper part of the style. 4. Ditto, the anther-tube laid open. 5. Two stamens, separated from the others. 6. Upper part of the style. 7. Fruiting receptacle. 8. Two setæ of the pappus. 9. Ripe achene.—Fig. 1 is slightly enlarged; the others are more considerably enlarged.

Explanation of Plate 389.—*Adenogonum decumbens*. Fig. 1. Leaf. 2. Ray-floret. 3. Disk-floret. 1. Two stamens, detached from the rest. 5. Style of a disk-floret.—The principal fig. and 1 are natural size; the others are more or less enlarged.

BOTRYCHIUM MATRICARIÆFOLIUM A. Br.* AND B. LANCEOLATUM Angst. IN BRITAIN.

By William Whitwell, F.L.S.

(Plate 388 b & c.)

Some months ago there was given to me by my friend Dr. Ornano St. Brody, with the name *Botrychium rutaceum* Swartz as his own identification, a specimen from Ayrshire which has the interest of being the only known British example of the species. It was collected by Dr. St. Brody on the sandy sea-shore of

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* In view of the uncertainty attaching to *B. rutaceum* Sw., I follow A. Braun and Luerssen in employing the name *B. matricariæfolium.*

Stevenston, Ayrshire, in July, 1887. He was then residing, as tutor, with a Glasgow family who occupied a marine villa at that place. Several other specimens were obtained at the same time. The death of his pupil caused a hurried return to Glasgow, and Dr. St. Brody's own return to London; and in the confusion the plants were mislaid—the present specimen, however, was unexpectedly found last autumn, inside an old catalogue. Proof of these statements is afforded by recent correspondence (in my possession) between Dr. St. Brody and the lady of the house, recalling the incident of the discovery of the fern. Dr. St. Brody says that he mentioned his "find" subsequently to several gentlemen, but, owing to his loss of the corroborative specimens, the subject was not followed up.

The plant is unquestionably *Botrychium matricariæfolium* A. Br. It agrees perfectly with the figure of a continental specimen (as *rutaceum*) given by Newman in the *Phytologist* (v. 133), and in his *History of British Ferns* (ed. 3, p. 322). I have compared it with the Brit. Mus. and Kew Botrychiums, and its identification is fully accepted by Mr. J. G. Baker.

The bibliographical history of the species is curious. Swartz first clearly distinguished it as a species in 1800, in Schrader's *Journal* (ii. 110), and included it as such in his *Synopsis Filicum*, p. 171 (1806); and subsequent botanists identified Ray's *Lunaria minor foliis dissectis* therewith. The first edition of Ray's *Synopsis*, p. 129 (1690), described three forms of Moonwort, *Lunaria*, of which this was the third; and the remark is made that Lawson supposes it to be a variety, not a distinct species. It is, according to Dillenius (R. *Syn.* ed. 3, p. 129), the same as Plukenet's *Lunaria botrytis minor pinnulis laciniatis*, "of our northern parts" (*Almagest.* p. 228, 1696). Ray himself (*Synopsis*, ed. 1 & 2) appears to cite prior authorities, Gerard, Parkinson, I. Bauhin, and C. Bauhin, only for his first form—the ordinary moonwort—and seems to have been the earliest British botanist to separate scientifically the three forms. He gives Westmoreland as the locality of the *Lunaria minor foliis dissectis.* Dillenius adds Doody's opinion that this is a distinct species, and says: "Mr. Doody received it from Sir Th. Willughby, but hath since seen it several times gathered by our Herb-women."

From the time of Ray (1690) up to Withering's ed. 7 (1830), the plant, as variety or species, was acknowledged in British floras. It appeared in Hill's *Flora Britannica* (1760), in Hudson's *Flora Anglica* (1762 & 1778), and in Withering's successive editions (1776–1830).

Linnæus, in *Species Plantarum*, ed. 1, p. 1064 (1753), described a var. γ of *Osmunda Lunaria*, with a reference to Breynius (Cent. 183, fig. 93). The same figure is cited in vol. iii. (p. 982) of Withering's ed. 7 (edited by his son) as "var. 3. Leaves cloven into segments," evidently as equivalent to *L. minor foliis dissectis.* So also is a variety mentioned by Bolton, *Filices Britanniæ*, p. 5 (1785), but this, from Bolton's reference to a figure in Gerard, is clearly meant for Ray's second form, *L. min. ramosa.* Bolton does not allude to that we are considering. In *English Botany*, ed. 1, v. 318 (1796), J. E. Smith recognized only *B. Lunaria*, with a note that its leaves were rarely bipinnate. But in his *Flora Britannica*, iii. 1107 (1800–1804), Smith accepts the third form of Ray as his own var. γ. Then came (1801 and 1806) the definition of *Botrychium rutaceum* by Swartz, and his inclusion thereunder of Linnæus's vars. β and γ, without, however, naming Ray or any English authority.

Smith's *English Flora*, iv. 328 (1828), under *Botrychium Lunaria*, makes a var. δ of Ray's third plant, and gives Swartz's and Willdenow's *B. rutaceum* as the same. The author adds a note: "δ has pinnatifid leaflets and a more spreading habit," and goes on to say: "All these varieties, and perhaps others, are found occasionally intermixed here and there with the plant in its proper or common form; but never, so far as I could learn, so numerously distinct as to have the appearance of a different species."

We now come to a period of neglect, dating from the issue of Hooker's *British Flora*, ed. 1, in 1830. In this *Botrychium Lunaria* Sw., without distribution of varieties, is alone given. But the remark is made (p. 451) that forms are found with more than one frond upon a stalk, and with the pinnules laciniated or even pinnatifid. Through all the editions of Hooker to the 5th (1842), and also in Hooker & Arnott (= Hooker, ed. 6, 1850), the exclusion is continued.

In *English Botany*, ed. 2, the species or variety is still unnamed, but the new editor (Chas. Johnson) gives (viii. 28) a fuller recognition of the range of departure from the type of *B. Lunaria.*

In 1844 the *London Catalogue* was first published. Its first four editions (to 1853) recognize only *B. Lunaria* Sw. Babington's *Manual*, eds. 1 (1843) to 3 (1851), gives *B. Lunaria* Sw. without hint of varieties or of another species.

In Newman, however, we find an exception to the current disregard of the plant. His *History of British Ferns* was published in 1840, and it quotes (p. 102) the three varieties of *B. Lunaria* as given in Smith's *English Flora.* In the second edition, p. 347 (1844), he identifies the *L. min. foliis dissectis* of Ray with *B. rutaceum* of Swartz, though without actually admitting the latter as a species. Then he describes three specimens obtained by Mr. Cruickshanks in August, 1839, at the Sands of Barry, near Dundee, and reproduces a drawing of one of these made by their discoverer. He did not see the originals. At this time—as his ed. 3 shows—Mr. Newman was not yet acquainted with the continental *B. rutaceum*, and he does not at present commit himself to any identification of the Barry plant.

Moore's *Handbook of British Ferns* appeared in 1848. In this (p. 150) *B. rutaceum* Sw. is made var. β *pinnatifida* of *B. Lunaria*, and the Cruickshanks plant becomes var. γ *linearis.* But in its second edition (1853) no varieties are given, nor any other species than *Lunaria* (p. 215), and no reference is made to the specimens from Barry.

Wood's *Tourist's Flora* (1850) does not recognize *B. rutaceum* as

British, though describing it (p. 426) as continental under the name *B. matricarifolium*.

In 1854 Mr. Newman returned to the subject in a long article in the *Phytologist* (v. pp. 129–134). He now figures *B. rutaceum*, from a German specimen sent him by Prof. Al. Braun, and unhesitatingly treats the Cruickshanks plant as a monstrosity thereof. He writes:—"It would seem . . . . that paucity of individuals was the *only* inducing cause with Sir J. E. Smith for rejecting *B. rutaceum* as a British plant; but still he retained it as a variety. The learned authors of the 6th ed. of the *British Flora*, and the very careful author of the *Manual*, go a step further: they ignore the existence of such a plant."

This challenge called up Professor Babington, who in a letter to Mr. Newman, as President of the Phytologist Club (*Phyt.* vol. v. pp. 175–6), referred to the article as follows:—"I am in effect blamed for taking no notice of *B. rutaceum* as a British plant. The fact is, that I had never either seen or heard of a native specimen until the appearance of that number (of the *Phytologist*); and Messrs. Hooker and Arnott seem to be in the same position. Smith's remark led me to believe that it was only some accidental variation that was intended by him. . . . . In the present state of the question I shall not venture to give any opinion."

Later in the year, ed. 3 of Newman's *Ferns* was issued, containing both the *Phytologist* drawing of *B. rutaceum* and the Cruickshanks figure from ed. 2, and specific value was allowed (pp. 320–323). Babington's *Manual*, ed. 4, also came out in 1854, with (p. 429) *B. rutaceum* Sw. doubtfully admitted. Newman's protest in its favour had been partially effectual.

Moore's *Ferns of Great Britain and Ireland*, nature-printed, folio, was published 1855–6, edited by Lindley. It gives (letterpress to pl. 51A) var. *rutaceum*. "The plant referred to *rutaceum* has been gathered on the sands of Barry." Further on: "It is reported to have been found near Buxton in Derbyshire. . . . . Though the *B. rutaceum* is by no means an unlikely plant to occur in Great Britain, the fact of its occurrence must, as yet, be regarded as doubtful."

In 1856 Dr. J. H. Kinahan read a paper before the Dublin Natural History Society (*Proceedings*, vol. i. pp. 25–28) on the varieties of *B. Lunaria*. After describing his var. *cristatum*, he suggests that this form may be "Doody's old plant recorded by Ray. I am inclined to think it is, though a most competent judge on the matter, Edward Newman, has referred this plant of Doody's to the species *rutaceum* Swartz . . . ." After discussing the points of Ray's description, Dr. Kinahan repeats that it in his judgment "more closely agrees with *B. Lunaria* var. *cristatum* Kin. than with *B. rutaceum*." He goes on to say: "Again, the plant seems to have occurred amongst the ordinary form, but sufficiently rarely to call for comments, all rather pointing to a variety than to an undoubted species, which, if it had occurred so frequently as Ray's plant appears to have done, ought to have fallen since then under the notice of some of our botanists, and Smith, from his notice, does not appear to me to have met the plant, as, had he met only the perfect form of this variety, it is too remarkable to have been passed over without description; and had he met the intermediate forms, he would certainly have mentioned so strong a proof as they would have afforded of the specific identity of the two forms. I know that these latter objections may also be urged against var. *cristatum;* but still that Ray actually saw or knew of Doody's plant is unmistakable, and it seems more likely to have been merely a variety of plant known to exist in England in quantity, than a plant of whose occurrence we have no proof, if we except Mr. Cruickshanks' specimen of monstrous growth from Dundee, and these are too much deformed to enable us to form an opinion with any degree of certainty. These arguments are not for one moment to be supposed to be directed against the existence of *B. rutaceum* as a species, but merely to prove that Doody's plants and these now exhibited [*i. e.* var. *cristatum* Kin.] were probably the same."

The *London Catalogue*, ed. 5 (1857), mentions the species for the first time, but only among excluded plants—evidently as "not distinctly ascertained in Britain." Hooker & Arnott's ed. 8, p. 596 (1860), accepts it, but with the reservation—"We have not ourselves seen British specimens. . . . . It is probable that Smith was correct in referring it to *B. Lunaria*, none of the varieties he mentions being 'so *numerously* distinct as to have the appearance of a different species': an observation that applies well to this one, only three specimens having been found on the Sands of Barrie, and none elsewhere since the days of Ray."

In Hooker's *Student's Flora*, p. 469 (1870), the plant is placed under *B. Lunaria* Sw. as "var. *rutaceum:* Sands of Barry."

Moore's *Octavo Nature-printed British Ferns* appeared in 1860. It includes (ii. 324–333) *rutaceum* as a var. of *B. Lunaria*, equivalent to Smith's var. δ, Swartz's *rutaceum* in part, Willdenow's *rutaceum*, and A. Braun's *matricariæfolium;* with an admission that it "is perhaps entitled to specific rank." . . . . "We have not seen a native specimen, but that from Dundee figured by Mr. Newman tolerably well agrees with the European *B. rutaceum.*" . . . . "Dr. Milde, who has paid much attention to the species of this genus, identifies it with *B. rutaceum* of Willdenow . . . excluding in part the *rutaceum* of Swartz. Dr. Milde's own illustrations of *B. lanceolatum* are most nearly accordant with the figure of the Dundee plant, which should probably bear the name of var. *lanceolatum* instead of *rutaceum*, hitherto applied to it."

Under var. 2, *tripartitum* (= var. *cristatum* Kin.), Mr. Moore says that Dr. Kinahan "suggests the possibility of this, instead of *rutaceum*, being the *Lunaria minor foliis dissectis* of Ray, but we should rather identify our next variety with Ray's plant." That next variety is 3. *incisum* Milde.

Dr. Boswell, in *English Botany*, ed. 3, vol. xii. pp. 27–29 (1877), approves of Moore's views with regard to both Ray's and Cruickshanks' plants. He places *rutaceum* Sw. under "excluded," though saying that Smith's var. δ is probably that form. *B. lanceolatum* is also ranked as excluded, with a similar reservation. "I do not think there can be any doubt that Mr. Newman's figure here referred to represents *B. lanceolatum* and not *B. rutaceum*. . . . . Unfortunately no further information can be obtained about the plant from the Sands of Barry, nor can any of Mr. Cruickshanks' three specimens be traced to their present owners, so far as I can discover. No one else has found it there, still *B. lanceolatum* seems to have a better claim to be included in the British lists than *B. rutaceum*."

Another change of treatment was thus induced. In the *Student's Flora*, ed. 3, p. 521 (1884), the distinct recognition of *rutaceum* of ed. 1 was suppressed, and only the reference substituted—"A form . . . . found on the Sands of Barry, has been doubtfully referred to *B. rutaceum* Sw." Mr. Britten (*European Ferns*, p. 187 (1881–2)) says of the plant, adopting the specific name *matricariæfolium* A. Br.: "Has been reported as a British plant, but its occurrence requires confirmation." The next issue of the *London Catalogue* (ed. 8, 1886) contains *incisum* Milde for the first time, as a var. of *B. Lunaria* Sw., and *B. lanceolatum* Angst. is introduced (as a species) with a ?. Then, in ed. 9 (1895), the latest, *lanceolatum* is omitted.

Babington, however, retained var. *rutaceum* (Sw.) to his last edition (8, p. 464: 1881), and withdrew all indications of doubt respecting it. His references are to Newman, *Ferns*, ed. 3, and Milde, *Fil. Europ.* 195.

Upon the question whether Cruickshanks' drawing in Newman represents, as that author supposed, an aberrant form of *B. rutaceum* Sw., or, in accordance with Moore's and Boswell's opinion, true *B. lanceolatum* Angström, I may observe that on carefully comparing the figure with the Kew and Brit. Mus. specimens under both names, I am convinced that the latter view is correct. There is a plant at Kew, evidently one of the best in the *lanceolatum* series, which might easily be supposed the original of the Cruickshanks drawing. Then the reinstallation of *B. rutaceum* on the strength of the Barry plant becomes erroneous.

What of its inclusion on the faith of the identity of Ray's third form with the Swartzian species? I have not been able as yet to examine this problem to my satisfaction. There is a specimen of Ray's in the Brit. Mus., but that is only the common form of Moonwort. In Sir J. E. Smith's collection there is nothing of which the same may not be said. It is not known that any British representative of Ray's form, Smith's variety, or the Swartz species is anywhere preserved. The Barry specimens have themselves disappeared: indeed, they do not appear to have been seen by anyone except their discoverer. Then, if Moore's and Boswell's view is correct, that the old descriptions represent nothing more than the var. *incisum* of Milde, the present specimen is left in sole but unquestionable possession of the field, as witness to the presence of *B. matricariæfolium* in Britain. It will be placed in the British collection in the National Herbarium.

I submit that good grounds have now been shown for the inclusion, henceforth, of *matricariæfolium* and *lanceolatum* in our

British lists, either as two species ("neither have I any doubt that *B. Lunaria*, *rutaceum*, and *lanceolatum* are three distinct species": Boswell in *Eng. Bot.*); or as one species (*matricariæfolium*) and a var. *lanceolatum* according to Hooker & Baker's *Synopsis Filicum*, a view which Mr. Baker strongly reasserts.

To the British localities named in the course of this paper may be added—to complete the list of those which I have met with—from Turner & Dillwyn's *Botanist's Guide*, ii. 720 (1805), for var. γ of Smith's *Flora Britannica*, "Side of the lake at Hornsea" (Hornsea Mere, Yorkshire), "on the authority of Mr. Teesdale."

Unfortunately, Dr. St. Brody is unable to revisit Stevenston in further search for the *B. matricariæfolium;* but he recollects the precise spot where he obtained his specimens, and will be glad to communicate with any botanist who proposes to investigate the district.

Explanation of Plate 388 b & c.—b. *Botrychium matricariæfolium* A. Br.: the Stevenston plant. c. *B. lanceolatum* Angst.: the Sands of Barry plant (after Newman).

SMITH'S GEORGIAN PLANTS.

By James Britten, F.L.S.

A note on a specimen in the Banksian Herbarium called my attention to the descriptions of certain new species in *The Natural History of the rarer Lepidopterous Insects of Georgia* (London, 1797; 2 vols. fol. pp. xv. 214, tt. civ), "collected from the observations of Mr. John Abbot, many years resident in that country, by James Edward Smith, M.D., F.R.S." From Smith's preface (which, like the text throughout, is printed both in English and in French), we learn that the excellent figures of insects and plants were drawn by Abbot, but that "the systematic names and definitions" were supplied by Smith: it may be worth while to quote the passage in which the division of labour is recorded:—

"The materials of the following work have been collected on the spot by a faithful observer, Mr. John Abbot, many years resident in Georgia, who, after having previously studied the metamorphoses of English insects, pursued his enquiries among those of Georgia and the neighbouring parts of North America. The result of his observations he has delineated in a style of beauty and accuracy which can scarcely be excelled, and has accompanied his figures with an account, as well as a representation of the plants on which each insect chiefly feeds, together with many circumstances of its manners, times of the different metamorphoses, and other interesting particulars. For all such facts recorded in these pages the public are entirely obliged to Mr. Abbot. His memorandums, not methodized by himself for publication, have merely been digested into some sort of style and order by the editor, who has generally added remarks of his own, in a separate paragraph and different type from the rest; and who has entirely to answer for the systematic names and definitions; that department having been left altogether unattempted by Mr. Abbot."

Although the few species of plants here first published have not been altogether overlooked, they have been variously quoted and often at secondhand from the abstract published by Roemer in 1801 (*Archiv* ii. 400–4). As the types are for the most part in the Banksian Herbarium, I have looked these up; and it seems worth while to place on record the results of my investigation. Two species are in the Linnean Herbarium, and I have included references to these, in order that all the novelties in the work cited might be brought together in one paper. I quote under each in the first instance the description given by Smith.

ASCLEPIAS AMPLEXICAULIS.

"The species of Swallow-wort now before us is, we believe, a nondescript, though formerly cultivated in the Kew Garden, and now preserved in Sir Joseph Banks's Herbarium. It should be inserted among the first species in the *Systema Vegetabilium*, and may be denominated ASCLEPIAS AMPLEXICAULIS, *foliis sessilibus ellipticis undulatis glaberrimis: basi cordatis amplexicaulibus, umbellis terminalibus.*" (Vol. i. t. vii. p. 13.)

The specimen in Herb. Banks. leaves no doubt as to the identity of this plant with *A. obtusifolia* Michaux (Fl. Bor. Amer. i. 115 (1803)). The *Index Kewensis* refers the later and generally received *A. amplexicaulis* Mich. (*l.c.*) to *A. humistrata* Walt.—a plant to which Michaux (*l. c.* 116) considered his *amplexicaulis* allied, and which Asa Gray (Proc. Amer. Acad. xii. 67) apparently regarded as synonymous with it, although he says "floribus rubris exceptis."

Unfortunately there is no specimen of Walter's plant in his herbarium, but Miss Vail, the most recent authority on this genus, considers it practically certain that *humistrata* Walt. must be adopted as the name for the species.

A. obtusifolia Mich. is considered by Asa Gray (*l.c.*) as identical with *A. purpurascens* of Walter (not of Linnæus), and Walter's specimen supports this conclusion: *A. purpurascens* Walt. is thus the earliest name for the plant. *A. purpurascens* L. is generally considered identical with *A. amœna* L., which has priority of place both in *Hort. Elthamensis* (on which the two species are founded) and in the *Species Plantarum*. Even those who do not attach importance to the position of a name upon a page will agree that it is allowable in cases like this to adopt either name, and the creation of new names might be avoided if *A. amœna* were adopted for the two Linnean plants, taking *A. purpurascens* Walt. for *A. obtusifolia* Mich. The names would then stand respectively thus:—

A. AMOENA L. Sp. Pl. 214 (1737).
A. purpurascens L. Sp. Pl. 214, non Herb.,* and of American authors.

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* The *A. purpurascens* of Linn. Herb., which, as Asa Gray has noted upon the sheet, does not agree with Linnæus's description, is identified by Miss Vail ith *A. incarnata* L.

A. PURPURASCENS Walt. Fl. Carol. 105 (1788) and Herb. ! non L.
A. amplexicaulis Smith in Georgia Insects, i. 13, t. vii. (1797) and in Herb. Banks. !
A. obtusifolia Mich. Fl. Bor. Amer. i. 115 (1803).

If, however, the American rule, "Once a synonym always a synonym," be followed, the name *purpurascens* must entirely disappear, and *A. amplexicaulis* Smith must be retained. The plants will then stand:—

A. AMŒNA L. Sp. Pl. 214 (1737).
A. purpurascens L. (ut supra).

A. AMPLEXICAULIS Smith (ut supra).
A. purpurascens Walt. non L.
A. obtusifolia Mich.

GLYCINE ELLIPTICA.

"This *Glycine*, received from Kalm, is referred in the Linnean herbarium to *comosa*, which species Linnæus took up entirely from Gronovius, without having seen it, and which indeed we believe, on the authority of original specimens in the Gronovian herbarium, to be by no means distinct from *G. monoica* of Linnæus (*bracteata* of Sp. Pl. ed. i.). As, however, all that Linnæus has said of this species refers to the plant of Gronovius, and even the short observation in Syst. Veg. is taken from the *Flora Virginica*, and not from Kalm's specimen, we have thought it best to give a new name to that specimen and our figure, and to define it *foliis ternatis: foliis ellipticis subtus pilosis glaucis, racemis axillaribus, leguminibus linearibus.*" (Vol. i. t. xxi. p. 41).

This plant—I think in consequence of a misunderstanding of Smith's meaning—has been generally treated (e. g. in S. Watson's *Bibliographical Index* and in the *Index Kewensis*) as a synonym of *Amphicarpæa monoica*. A mere glance at the figure, however, shows that Smith had a very different plant in view; and Miss Vail, who has examined with me Smith's type in the Linnean Herbarium, agrees in referring it to *Galactia glabella* Mich.

SPERMACOCE HYSSOPIFOLIA.

"The plant here delineated appears to be a new species of *Spermacoce*, which is preserved, without a name, in the Linnean Herbarium. Mr. Abbot calls it wild thyme, probably from its habit, for it has no other affinity to any plant of the thyme kind. The root is strong and woody, the stem shrubby, and somewhat diffuse. It may be characterized as follows:—

"SPERMACOCE HYSSOPIFOLIA, *foliis lineari-lanceolatis revolutis margine scabris, verticillis paucifloris.*" (Vol. i. t. xxxviii. p. 75.)

This name (which is in the *Index Kewensis*) was not taken up in the *Prodromus;* a fuller description of the plant is given in Rees' *Cyclopædia*. The plant is in the Linnean Herbarium, but I have not been able to compare it with other species.

QUERCUS LOBULATA Soland. MSS.

"The species of oak here delineated is unquestionably a new one, and may be characterised *foliis subtus pubescentibus duplicato* *lobatis scabriusculis lobis lobulisque rotundatis*, which are nearly the words of Dr. Solander. The leaves are said to be deciduous. Their rough upper surface is remarkable in the specimens in Sir Joseph Banks's herbarium." (Vol. i. t. xlvii. p. 93.)

The specimens referred to are from John Bartram, who sent many North American plants to Banks.

This name seems to have escaped the notice of American botanists, but is duly recorded in the *Index Kewensis*, where it is referred as a synonym to the later *Q. obtusiloba* Mich. (1801). Both, however, must give way to *Q. stellata* Wang. (1787), adopted by Alphonse De Candolle in the *Prodromus*—to which Dryander in Solander's MSS. subsequently referred Solander's name.

Prof. Sargent (*Silva N. Amer.* viii. 37) and Dr. Britton (*Illustr. Flora*, i. 520), in accordance with the newest American rules, raise the varietal name given by Humphrey Marshall in 1785 to specific rank, and call the tree respectively "*Quercus minor* Sarg." and "*Quercus minor* (Marsh.) Sarg." I cannot imagine that botanists generally will assent to the unnecessary confusion which the general adoption of this principle would bring about, and we observe that the Berlin rules sanction no such action. To take an instance: Linnæus (*Species Plant.* ed. i. 98) calls the plant figured by Commelin (*Hort. Med. Amstel.* ii. 185, t. 93) *Scabiosa leucantha β. spuria*. This plant he subsequently (*Pl. rar. Afr.* (1760) 8) made the type of his *S. rigida*—a name which (under *Cephalaria*) has been adopted for the same species by all subsequent authors. It thus appears that Linnæus did not act on any such rule as that recently formulated at Madison, which, if adopted, would necessitate in this case a new combination and needless confusion, for *spuria* has never been used in connection with the species and has long been forgotten. Moreover, although suitable enough as a varietal name, it is inappropriate for the species, especially when that is put into its right genus and specifically characterized; in a smaller degree the same objection applies to the adoption of *minor*, which, although perhaps appropriate to the tree as contrasted by Marshall with *Quercus alba*, is by no means suitable when the genus at large is considered.

The oak figured on t. 50 calls for a note. Smith (p. 99) calls it *Quercus rubra* Linn., and says:—"This kind of Red Oak is distinguished in Dr. Solander's manuscripts as a variety by the name of *ambigua*, but was probably thought not sufficiently marked to deserve a place in the *Hortus Kewensis*." The name as a variety has not been taken up, and might have been allowed to pass unnoticed had it not been published by Roemer as a species: he says (*Archiv* ii. 404—misquoted in DC. Prodr. i. 8 as "coll. i.") of the oak on Abbot's plate 50, "diese ist in dem MS. von Solander *Quercus ambigua* gennant."

This indeed is the case; Solander in his MSS. had first called it *rubra*, but substituted the name *ambigua*, with the phrase "foliis cuneiformibus apice trilobis latere integerrimus." Dryander later identified this with *Q. nigra* L., with a reference to a specimen from Bartram which is doubtless the one written up by him in Herb.

Banks with the same name. Prof. Sargent (*Silva N. Amer.* viii. p. 147) refers Abbot's figure to *Q. cuneata* Wang.

"MIMOSA MICROPHYLLA Ait. Hort. Kew. ed. 2 ined."

"The plant in the plate is a species of *Mimosa*, which will appear in the second edition of the *Hortus Kewensis*, and for the following specific character and synonym of which we are obliged to Mr. Dryander.

"MIMOSA MICROPHYLLA, *undique aculeata, foliis bipinnatis octojugis: sedecimjugis, capitulis axillaribus pedunculatis solitariis binisve.*

"M. Intsia. *Walt. Flo. Carolin.* 252." (Vol. ii. t. lxii. p. 128.)

This name stands in Index Kewensis: "*Mimosa microphylla* Sm. ex Steud. Nom. ed. i. 533 = *Schrankia uncinata*." Steudel's identification was arrived at by Dryander after he had communicated the description to Smith: the plant stands in Hort. Kew. (ed. ii. v. 467) as *Schrankia uncinata* Willd., and that name is substituted for the former by Dryander in the Solander MSS., as well as in Herb. Banks.

The supposed new *Mimosa* was originally based on a specimen in Herb. Banks. endorsed "America Septentr. J. Bartram. Cree," to which a specimen from "Hort. Kew. 1789" was subsequently added by Dryander. An examination of these shows that (as already noted by Mr. Carruthers in the herbarium) both should be referred to *S. angustata*—a species distinguished by Torrey and Gray (*Fl. Bor. Amer.* i. 400) in 1840; and to this the figure should also be referred. *Mimosa Intsia* Walt. non Linn., which Willdenow, Torrey and Gray, Bentham, and indeed all botanists, down to Dr. Britton and the *Index Kewensis*, have agreed to refer to *S. uncinata*, should also, as Walter's type specimen shows, be transferred to *S. angustata*, in common with most of the synonyms. The *Index Kewensis* does not include the name *S. reticulata*, which is published by Torrey and Gray as a synonym of *S. uncinata*. The synonymy of the two species will run:—

SCHRANKIA UNCINATA Willd. Sp. Pl. iv. 1043 (1805) excl. synonymy; Torr. & Gray, Fl. Bor. Amer. i. 400 excl. syn. (1840).
S. reticulata Pickering ex Torr. & Gray, l. c., p. 401.
Leptoglottis Nuttalii DC. Mon. Leg. 451 (1825).

S. ANGUSTATA Torr. & Gray, l. c. 400.
Mimosa Intsia Walt. Fl. Car. 252 (1788) and Herb.! non Linn.
M. microphylla Dryand. ex Smith in Georgia Insects, ii. 123, t. 62 (1797) and in Herb. Banks!
M, horridula Mich. *Fl. Bor. Amer.* i. 254 (1803); Ventenat, *Choix des Plantes*, t. 28 (1803).
S. uncinata [Dryand. in] Ait. Hort. Kew. ed. ii. v. 457 (1813) and in Herb. Banks! auct. plur. non Willd.

I place Michaux's *horridula* under this species because, although his description applies equally to either, he cites Walter's plant as a synonym; Ventenat, in his very full description, makes no reference to the prominent reticulate veins of the leaflets which characterize the true *uncinata*, and says his plant is certainly identical with Michaux's.

De Candolle's description of the leaflets makes it clear that Nuttall's plant from Arkansas, on which he bases his supposed new genus, must be referred to *S. uncinata*. We have what is no doubt the same gathering from Nuttall ("Arkansa prairies") which he had first named *horridula*, then considered a new species which he proposed to call *reticulata*, and finally referred correctly to *uncinata*. The Texan plant distributed by Berlandier (no. 1605) as *Leptoglottis Nuttalii*, although approaching *angustata* in general appearance, has the reticulated leaflets which characterize *S. uncinata*.

"CLEMATIS ROSEA nov. sp.

"*Clematis reticulata* Walt. Flo. Carol. 156?

"The *Clematis* seems to be hitherto nondescript, of which we have seen a specimen from the Kew garden in Sir Joseph Banks's collection. It may be characterized *Foliis simplicibus pinnatisque cirrhosis integerrimis, petalis lanceolatis, seminibus caudisque glabriusculis*.

"This might certainly be taken for the *C. reticulata* of Walter's *Flora Caroliniana*, p. 156, copied into Gmelin's *Systema*, p. 873, if the last-mentioned writer only were confided in; for he has omitted a part of [Walter's] character *caudis plumosissimis*, and the rest agrees exactly with our plant. But in the Kew specimen, which, though its leaves are more acute and sometimes lobed, we can scarcely think different from that before us, the large compressed seeds are only slightly downy as well as their *caudæ*. We must leave the absolute determination of this point till we are possessed of better materials to decide it." (Vol. ii. t. ci. p. 201.)

De Candolle (*Syst.* i. 157, *Prod.* i. 8) erroneously attributes the name *C. rosea* to Abbot, and cites his figure as a synonym of *C. reticulata* Walt.—the type of which we have in Walter's herbarium. So far as the figure goes, this is probably correct: the Banksian specimen, however, upon which Smith bases his description, is clearly *C. crispa* L.; the specimens, although much damaged, are in good fruit, which corresponds excellently with the figure of Dillenius (*Hort. Eltham.* t. 73, p. 86), upon which Linnæus established this species. The specimen, rather than the figure, is the type of Smith's *C. rosea*, which should therefore stand in the *Index Kewensis* as = *C. crispa*, instead of = *C. reticulata*, as at present.

THE MOSSES OF CHESHIRE.

By J. A. WHELDON.

IN preparing this list of Cheshire Mosses, I have procured the bulk of my information from Dickinson's *Flora of Liverpool*, Marratt's *Liverpool Mosses* (referred to as *M*), and Whitehead's *Moss Flora of Ashton-under-Lyne* (*W*). A valuable article in the *Naturalist*, ix. 202, on "The early bryological work of William Wilson," by Mr. James

Cash (*C*), also proved of material aid. Grindon's *Manchester Flora* has been utilized as far as its ambiguity (as to the division of responsibility for the various records) would permit. The remaining records are extracted from various periodicals and handbooks of Mosses, except those to which no collector's name is attached. These last are given on my own responsibility, and I regret that I have not been able to render them more numerous and important.

It would be presumptive on my part to affect to verify records by bryologists of such standing and well-known accuracy as are many named in the list, therefore the sign ! is used *only* to imply that I have found the moss still existing in the locality indicated within the last five years; and the double sign !! indicates that a specimen from the station is in my herbarium. Species which are now believed to be first recorded for v.-c. 58 are marked with an asterisk.

In presenting this list, I am only too conscious of its imperfections, but I hope its compilation will be of some little help to those studying the distribution of our species, or at least form a nucleus for future work in the county.

The number of species and varieties exceeds that of the neighbouring v.-c. S. Lancashire by forty-five, from which we may infer, either that the county has been more carefully worked, or that the climatic and geological conditions of Cheshire are the more suitable to the growth of mosses. But, speaking broadly, the physiography of the two counties is almost identical. In each we have a belt of arid sand dunes on the extreme west, with a flora that is *sui generis*. Next to this, a broad tract of new red sandstone, divided on the east by a thin wedge of Permian limestone from a breadth of millstone grit. There is an extensive forest tract at Delamere, a feature which is entirely absent from S. Lancashire. Probably the true explanation of the superiority of Cheshire as a moss-producing country (for individually as well as specifically they are more numerous than in v.-c. 59) is to be found in its greater freedom from the baneful influences of the proximity of large cities and factories. In S. Lancashire we are scarcely beyond the smoke radius of one large city before we penetrate that of the next, and few mosses flourish in such an atmosphere. The list is arranged according to the sequence of species in Mr. Dixon's *Handbook Catalogue of British Mosses*.

Sphagnum cymbifolium Ehrh. Staley Brushes! (*W*). Wirral (*M*).—Var. *squarrosulum* Nees. Staley Brushes (*W*).—*S. tenellum* Ehrh. Bebbington Heath and Bidston Hill (*M*) (not seen recently, *Wheldon*). Carrington Moss, *Hunt*!!—*S. subsecundum* Nees. Carr Brook and Staley Brushes! (*W*). Hale Moss, *Hunt*!! — Var. *contortum* Schultz. Staley Brushes (*W*). — Var. *auriculatum* Ldb. Delamere (*W*)!! — Forma *submersum*. Lindow Common (*W*)!!—*S. laricinum* Spruce. Vale Royal, *Wilson* (?). Over (*W*)!!—*S. teres* Angstr. Knutsford Moor, Wybunbury Bog, and Newchurch Bog, Hobkirk's *Synopsis*. — *S. squarrosum* Pers. Hattersley (*W*)!! Wirral! *Fl. Liverpool*.—*S. acutifolium* Ehrh. Staley Brushes! (*W*). Wallasey Moss (*M*). — *S. fimbriatum* Wils. Lindow Common, *Wilson* (*C*)!! Hollingworth (*W*).—*S. intermedium* var. *pulchrum* Ldb. Carrington Moss, *Hunt.* — *S. cuspidatum* Ehrh. Lindow Common (*W*)!! Staley Brushes!! Bidston Heath!—Var. *plumosum* N. & H. Lindow Common (*W*)!!

Andreæa Rothii W. & M. Staley Brushes (*W*).—*A. crassinervia* Bruch. Crowden and Tintwistle!! (*W*).

Tetraphis pellucida Hedw. Haybrick Hill, *Sansom.* Newchurch Bog, *Wilson.* Delamere, *Burgess.* Bidston Hill! *Fisher.* Staley Brushes!! — *T. Browniana* Grev. Staley Brushes and Hattersley (*W*). Helsby, *Wilson.*

Catharinea undulata W. & M. Common. Staley Brushes!! Eastham!! — *C. crispa* James. Staley Brushes (*W*)!! — Var. *densifolia* Ldb. Oakmere, *Wilson.*

Oligotrichum incurvum Ldb. Staley Brushes (*W*).

Polytrichum nanum Neck. Eastham and Storeton (*M*). Delamere (*C*)!! Hale Barns, *Holt*!! — *P. aloides* Hedw. Common. Staley Brushes!! Wirral!—Var. *Dicksoni* Wallm. Delamere, *Holt.* — *P. urnigerum* L. Marple (*W*). Alderley Edge, *Flor. Manch.* Storeton! *Sansom* — *P. piliferum* Schreb. Staley Brushes! and Ogden Clough (*W*). Upton, *Sansom.* Storeton (*M*).—*P. juniperinum* Willd. Flaybrick Hill, *Sansom.* Bebington!! (*M*). Hale Moss (*W*)!! Helsby (*C*)!! Storeton!!—*P. strictum* Banks. Knutsford Moor and Wybunbury Bog, *Wilson.* — *P. gracile* Dicks. Oakmere and Knutsford Moor, *Wilson.* Hale Moss, *Hunt*!! Wallasey Moss, *Sansom.* Eastham (*M*). Eaton Moss, *Flor. Manch.* — *P. formosum* Hedw. Cotterill Clough, *Crozier.* — *P. commune* L. Common! Hale Moss (*W*)!!—Var. *minus* Weis. Oakmere, *Wilson.* Delamere, *Holt*!!—Var. *fastigiatum* Wils. Delamere, *Holt*!!

Buxbaumia aphylla L. Ogden Clough, *Hannan, Wood, and Whitehead*!!

Archidium alternifolium Schp. Mere, *Wilson.*

Pleuridium axillare Ldb. Dukinfield and Werneth Low (*W*).—*P. subulatum* Rab. Godley and Marple (*W*). Egremont, *Skellon.* Bebbington Heath (*M*). Hattersley!! — *P. alternifolium* Rab. Mere and Grappenhall, *Wilson.* Hale, Ashley, and Helsby, *Hunt.* Storeton (*M*). Hattersley, *Whitehead & Scholefield*!!

Ditrichum tenuifolium Ldb. Bowdon, *Hunt.* — *D. homomallum* Hpe. Eastham (*M*). Sale and Alderley Edge!! *Wilson.*—*D. flexicaule* Hpe. New Brighton, *Skellon.*

Seligeria recurvata B. & S. Marple, *Flor. Manch.*

Brachyodus trichodes Fürnr. Alderley Edge (*W*).

Ceratodon purpureus Brid. Hollingworth, *Scholefield*!! Very common!

Dichodontium pellucidum Schp. Staley Brushes (*W*). Hollingworth, *Scholefield*!!—*D. flavescens* Ldb. Staley Brushes and Warren Wood (*W*).

Dicranella heteromalla Schp. Very common. Tintwistle!! Bidston!!—*Var. *interrupta* B. & S. Tintwistle!!—Var. *sericea* Schp. Alderley Edge, *Hunt.* — *D. cerviculata* Schp. Alderley and Sinks Moss (*C*). Storeton!! — *D. crispa* Schp. Thelwall, *Wilson.* Ashley (*C*)!! Alderley (*W*)!!—*D. secunda* Ldb. Near Eastham (*M*).

Staley Brushes, *Jethro Tinker* (not found recently). — *D. rufescens* Schp. Whaley Reservoir, *Barker* !! Ashley, *Hunt*. Staley Brushes (*W*). — *D. varia* Schp. New Ferry (*M*). Bidston, *Scott* !! Hattersley (*W*) !! Cotterill Clough, *Wilson*. — Var. *tenuifolia* B. & S. Marple (*W*). Ashley Mill, *Holt*. — Var. *callistoma* Schp. Ashley Mill, *Holt*. — *D. Schreberi* Schp. Thelwall, *Wilson*. Sale, *Holt*. Bowdon, Ashley, and Alderley, *Hunt*. — Var. *eluta* Schp. Ashley, *Hunt*. Walton (*C*) !!—*D. squarrosa* Schp. Crowden (*W*). Ogden Clough, *Scholefield*. Staley Brushes !! *Hobson*.

Blindia acuta var. *trichodes* Braith. Egerton (*W*).

Dicranoweissia cirrata Ldb. Staley Brushes (*W*). Bidston Hill, *Skellon*. Dunham, *Flor. Manch.* — (*D. crispula* Ldb. New Ferry and Tranmere, *Sansom*.) This requires confirmation.

Campylopus flexuosus Brid. Staley Brushes !! and Marple (*W*). Bidston !! *Skellon*. — *C. fragilis* B. & S. Staley Brushes (*W*) ! Alderley Edge and Frodsham, *Wilson*. Storeton !! Forma *densus* B. & S. Helsby (*C*).—*C. pyriformis* Brid. Near Tranmere, *Fisher*. Delamere, *Holt* !! Bidston Hill !!—*C. brevipilus* B. & S. Oakmere, *Wilson*.

Dicranodontium longirostre B. & S. Staley Brushes, *Hunt & Whitehead* !!

Dicranum Bergeri Bland. Wybunbury Bog, *Wilson*. Oakmere, *Hunt* !! — *D. Bonjeanii* De Not. Knutsford (*C*) !! Higher Bebington (*M*). Staley Brushes ! (*W*). — *D scoparium* Hedw. Common. Hollingworth ! and Marple (*W*). West Kirby !! — *D. majus* Turn. Staley Brushes ! (*W*). — *D. fuscescens* Turn. Staley Brushes ! (*W*).—Var. *falcifolium* Braith. Staley Brushes (*W*) !! — *D. Scottianum* Turn. Congleton Cloud, *Wilson* (not found again in 1883, *J. Cash*).

Leucobryum glaucum Schp. Staley Brushes ! (*W*). Bidston ! and Heswall, *Skellon*. Storeton ! *Sansom*. Eastham (*M*).

Fissidens exilis Hedw. Butts Clough, *Wilson*. Romiley (*W*). New Ferry (*M*). Bowdon, Cotterill Wood, and Ashley, *Hunt*.—*F. viridulus* Wahl. Tintwistle, *A. Wood*. Woodley (*W*). Storeton !! Eastham !! — Var. *Lylei* Wils. Ashley, *Wilson*. Marple, *Hunt*. Gillbrook (*M*). — *F. pusillus* Wils. Mankum Wood (*W*). Ashley and Bowdon, *Hunt*. Bromboro Wood ! (*M*).—Var. *madidus* Spruce. Marple (*W*). — *F. incurvus* Starke. New Ferry (*M*). Ashley Mills and Butts Clough, *Hunt*. Marple, *Scholefield*. Romiley !! — *F. tamarindifolius* Wils. Over, *Wilson*. Oak Wood (*W*). Oakmere and Ashley, *Hunt*. Romiley, *Scholefield*. (Gillbrook, *Skellon*). Requires confirmation.—*F. bryoides* Hedw. Common. Bidston ! (*M*). Marple !! Raby Mere !!—*F. crassipes* Wils. Ashley Sluice, Bowdon, *Hunt*. — *F. osmundioides* Hedw. Staley Brushes and Ogden Clough (*W*). — *F. adiantoides* Hedw. Staley Brushes ! (*W*). New Brighton and Thurstaston, *Skellon*. Knutsford Moor, *Hunt*. — **F. taxifolius* Hedw. Very common. Bromboro !!

Grimmia apocarpa Hedw. Marple, *Sidebotham*. Romiley (*W*). West Kirby and Thornton (*M*).—Var. *rivularis* W. & M. Romiley (*W*). — *G. maritima* Turn. West Kirby and Eastham !! (*M*).

Leasowe !! — *G. pulvinata* Sm. Hattersley and Marple ! (*W*). Eastham ! — *G. trichophylla* Grev. Frodsham, *Robinson.* — *G. Doniana* Sm. Eastham (*M*).

Rhacomitrium ellipticum B. & S. Staley Brushes ! (*W*). — *R. fasciculare* Brid. Apethorne and Ogden Clough (*W*). Staley Brushes, *Manch. Flor.* Bidston Hill, *Harrison.* — *R. lanuginosum* Brid. Thurstaston, *Skellon.* — *R. canescens* Brid. Alderley Edge, *Manch. Flor.* Bidston Hill (*M*). — Var. *ericoides.* Bidston Hill, *Skellon.*

Ptychomitrium polyphyllum Fürnr. Romiley, Marple ! and Staley Brushes ! (*W*). Bidston, *Skellon.*

Campylostelium saxicola B. & S. Romiley, *Whitehead & Holt.*

Acaulon muticum C. M. Baguley, *Manch. Flor.* Moreton !

Phascum cuspidatum Schreb. Hattersley (*W*). Wallasey !!

Pottia Heimii Fürnr. Poolton and Leasowe, *Higgins & Marrat.* Eastham !!—*P. truncatula* Ldb. Common. Marple (*W*). Wirral ! —*P. intermedia* Fürnr. Over, *Wilson.* Hatherlow and Marple (*W*). Wirral, *Skellon.* — **P. littoralis* Mitt. Wallasey !! — *P. Wilsoni* B. & S. Over, *Wilson* !! West Kirby, *Boswell.*—*P. minutula* Fürnr. Marple (*W*) !! Barnston and Gillbrook (*M*). Wallasey !! — *P. lanceolata* C. M. Hatherlow, *R. Buxton.*

Tortula pusilla Mitt. Cheshire, *Wilson.* Bidston, *Skellon.* Disley, *Sidebotham.* — *T. rigida* Schrad. Roe Cross, Romiley, and near Mottram (*W*) !! Hyde, *Scholefield.* Marple, *Sidebotham.*—*T. ambigua* Angstr. Romiley (*W*).—*T. aloides* De Not. Hattersley and Romiley (*W*). New Ferry ! (*M*). Marple, *Hunt.* — *T. marginata* Spr. Appleton, *Wilson.* Ashley, *Holt* !! Bowdon, *Hunt.*—*T. muralis* Hedw. Very common. Marple !! On the exposed Leasowe embankment it is remarkably compact, and grey with the very long excurrent nerve. — Var. *æstiva* Brid. Ashley Mill, *Dr. Wood.* Quarry near Bromboro !! — *T. subulata* Hedw. Romiley, Marple, and Matley (*W*). Wallasey !! West Kirby !! — Var. *subinermis* Wils. Thelwall, &c., *Wilson.* — *T. mutica* Ldb. Bowdon, *Hunt.* — *T. angustata* Wils. Castle Mill, Ringway, *Wilson.*—*T. ruralis* Ehrh. Marple (*W*).—**T. ruraliformis* Dixon. West Kirby !! Wallasey !!

**Barbula rubella* Mitt. New Brighton !! Wallasey !! — *Var. *dentata* Braith. Wallasey !!—*B. tophacea* Mitt. Hattersley !! and Marple (*W*). Bowdon, *Hunt.* Eastham !! Bromboro !!—*B. fallax* Hedw. Marple (*W*). Eastham !! — *B. rigidula* Mitt. Staley Brushes and Marple (*W*).—*B. cylindrica* Schp. Cheshire, *Braithw. Brit. Moss Flora.*—*B. revoluta* Brid. Stretton Moss, *Wilson.* Bidston ! *Harrison.*—*B. convoluta* Hedw. Marple ! Disley and Mellor (*W*). Gillbrook (*M*). Romiley !!—*B. unguiculata* Hedw. Marple ! (*W*). Storeton !! Eastham !!

Leptodontium flexifolium Hpe. Alderley Edge, *Wilson.* Buckton Castle, *Jethro Tinker.*

Weisia crispa Mitt. Appleton, *Wilson.*—*W. multicapsularis* Mitt. Appleton, *Wilson.* Ashley, *Hunt.*—*W. rostellata* Ldb. Mere, *Wilson.* —*W. squarrosa* C. M. Over, *Wilson.* Hattersley, *Whitehead & Scholefield.* Bowdon, Helsby, and Mobberley, *Hunt.* Handforth, *Cunliffe.*

—*W. microstoma* C. M. Over and Appleton, *Wilson.* Gillbrook (*M*). —*W. viridula* C. M. Romiley and Marple (*W*). Leasowe !! — *W. mucronata* B. & S. Hattersley, *Whitehead & Scholefield.* Ashley, *Holt.* Bowdon, Helsby, and Oakmere, *Hunt.* — *W. tenuis* C. M. Timperley and Lymm, *Wilson.* Ashley, *Holt.* — *W. rupestris* C. M. Marple (*W*). — (*W. curvirostris* C. M. New Brighton, *Skellon.*) Requires confirmation.

Trichostomum mutabile Bruch. New Ferry! (*M*).—**T. flavovirens* Bruch. Wallasey !! — *T. tortuosum* Dixon. New Brighton, *Skellon.* Wallasey, *Harrison.*

Cinclidotus fontinaloides P. B. Marple Aqueduct, *Jethro Tinker.* Extinct there now.

Encalypta streptocarpa Hedw. Romiley (*W*). New Brighton !! *Skellon.*

Zygodon conoideus H. & T. Cotterill Clough, *Crozier.*

Ulota crispa Brid. Cotterill Clough, *Crozier.* — *U. Bruchii* Hornsch. Bromboro and Eastham Wood (*M*). I have looked for it in vain several times, and fear it is now extinct. — *U. phyllantha* Brid. Near Rock Ferry (*M*). Extinct?

Orthotrichum anomalum var. *saxatile* Milde. Hatherlow and Marple (*W*).—*O. affine* Schrad. Prenton (*M*). Congleton, *Wilson.* Ringway, *Flor. Manch.*—Var. *fastigiatum* Hüb. Frodsham, *Wilson.* —*O. rivulare* Turn. Cheshire, *Wilson.* — *O. stramineum* var. *patens* Vent. Congleton, *Wilson.*—*O. tenellum* Bruch. Ellesmere (*M*).— *O. pulchellum* Sm. Near Over, *Wilson.* — *O. diaphanum* Schrad. Eastham, *Higgins.* Bromboro and Bebington Woods, *Fisher.* Dunham, *Flor. Manch.*

Schistostega osmundacea Mohr. Frodsham !! *Wilson.* Alderley Edge !! *Hunt.* Overton, *Robinson.* Helsby (*C*) !!

Splachnum ampullaceum L. Staley Brushes (*W*). Stretton Moss and Sinks Moss, *Wilson* (now drained, *Cash*). — *S. sphæricum* L. f. Staley Brushes (*W*). Currington Moss, *Flor. Manch.*

Tetraplodon mnioides B. & S. Staley Brushes, *Whitehead & Scholefield.* Abbott's Moss (*C*).

Discelium nudum Brid. Marple and Staley Brushes (*W*) !! First found by Geo. Caley.

Ephemerum serratum Hpe. Marple and Mere Mere !! (*W*). Moreton !—*E. sessile* Rab. Mere, *Wilson.* — Var. *brevifolium* Schp. Mere, *Wilson.*

Physcomitrella patens B. & S. Appleton (*C*). Crewe, *Wilson.* Ashley Mill and Mere Mere, *Hunt.*

Physcomitrium sphæricum Brid. Mere Mere, *Wilson* !! Todbrook Reservoir, *Barker.* — *P. pyriforme* Brid. Matley and Marple (*W*). Hartford (*C*) !! Wallasey, *Sansom.* Raby Mere !!

**Funaria fascicularis* Schp. Spital !! — *F. ericetorum* Dixon. Ogden Clough, *A. Wood.* Crowden (*W*). — *F. Templetoni* Sm. Stockport, *Flor. Manch.* — *F. hygrometrica* Sibth. Bromboro !! &c. Very common.

Amblyodon dealbatus P. B. Marple, *Hunt.* Near Bidston Hall, *Skellon.* Not in latter locality now.

Paludella squarrosa Brid. Knutsford Moor, *Wilson.* Now extinct.

Aulacomnium androgynum Schwgr. Over, *Wilson*. Stockport, (*W*). Delamere (*C*)!! Bidston!! — *A. palustre* Schwgr. Bidston Marsh, *Harrison*. Wybunbury Bog (*W*)!! Brookhouse Moss (*C*)!! Eaton Moss, *Flor. Manch.*

Bartramia pomiformis Hedw. Over, *Wilson*. Alderley (*W*)!!

Philonotis fontana Brid. Staley Brushes! and Ogden Clough (*W*). Bidston, *Sansom & Skellon*.— *P. cæspitosa* Wils. Walton Swamps, *Wilson*. — *P. calcarea* Schp. Hale Moss and Staley Brushes, *Flor. Manch.* — *P. capillaris* Ldb. Alderley, *Hunt.*

Breutelia arcuata Schp. Staley Brushes, *Tinker*. Extinct now.

Orthodontium gracile Schwgr. Helsby, Frodsham, and Alderley Edge!! *Wilson.*

Leptobryum pyriforme Wils. Bidston Moss and Higher Bebington (*M*). Bowdon, *Manch. Flor.* Wallasey!!

Webera nutans Hedw. Staley Brushes (*W*). Storeton!!—Var. *longiseta* B. & S. Woolston Moss, *Wilson*. Lindow Common (*W*)!! — *W. annotina* Schwgr. Ogden Clough (*W*). Alderley, *Hunt.* Storeton!!—*W. carnea* Schp. Arden Hall, Marple, and Hattersley!! (*W*). Upton (*M*). Eastham!!—(*W. Tozeri* Schp. Near Wallasey Pool (*M*)). This is very doubtful, and requires confirmation. — *W. albicans* Schp. Arden Hall and Marple (*W*). Lower Bebington (*M*). Tintwistle!!

(*Bryum julaceum* Schr. is doubtfully mentioned in the Liverpool list of mosses as growing on Bidston Hill. I am not aware that it was ever confirmed, and it is no doubt an error.) — *B. pendulum* Schp. Matley (*W*). Wallasey!!—**B. lacustre* Brid. Leasowe!!— *B. inclinatum* Bland. Dukinfield (*W*). Wallasey!!—*B. uliginosum* B. & S. Hattersley, *Whitehead & Scholefield*!! Bowdon, *Hunt.*— *B. pallens* Milde. Ogden Clough (*W*). Leasowe!— *B. turbinatum* Schwgr. Marple (*W*). — *B. bimum* Schreb. Marple (*W*). Hale Moss, *Wilson*.—*B. pseudo-triquetrum* Schwg. Bebington Woods and Bidston, *Skellon*.— *B. pallescens* Schleich. Appleton, *Wilson*.— *B. intermedium* Brid. Romiley and Marple! (*W*). Eastham! Wallasey!!—*B. cæspiticium* L. Dukinfield and Godley (*W*). Wallasey!! —*B. capillare* L. Marple! and Romiley (*W*). Eastham!! Raby Mere!! — *B. atropurpureum* W. & M. Dukinfield, Hattersley, and Compstall Bridge (*W*). Bidston Hill!! Eastham!! — **B. murale* Wils. Bromboro!!—*B. argenteum* L. Common. Bidston!! &c.— Var. *majus* B. & S. Romiley, *Whitehead & Holt*.—*B. roseum* Schreb. Marple (*W*). New Brighton, *Skellon*. Over, with fruit, *Wilson.*

Mnium affine Bland. Wybunbury Bog, Knutsford Moor, and Over, *Wilson*. Hazel Grove (*W*). New Brighton, *Skellon*. — Var. *elatum* B. & S. Hale Moss, *Wilson*. — *M. cuspidatum* Hedw. New Brighton (*M*). — *M. rostratum* Schrad. Cotterill Clough, *Crozier*. Marple (*W*)!! Wallasey!! — *M. undulatum* L. Common. Butts Clough, with fruit, *Wilson*. Prenton, with fruit (*M*). Wallasey!!— *M. hornum* L. Common. Raby Mere!! and Eastham!! with fruit. —*M. punctatum* L. Marple and Staley Brushes (*W*). Bebington Woods!! *Skellon*. Raby Mere!!— *M. subglobosum* B. & S. Staley Brushes (*W*). Brookhouse Moss (*C*)!! Tintwistle!

Fontinalis antipyretica L. Newton Moor, Hatherlow, and Hollingworth (*W*). Frequent in Wirral, *Harrison.*

Cryphæa heteromalla Mohr. Woods near Ringway, *Wilson.* Bebington Wood (*M*).

Neckera complanata Hübn. Arden Hall and Chadkirk (*W*). Catterill Clough, *Manch. Flor.* Storeton, *Skellon.* Eastham Wood!! *Sansom.*—*N. pumila* Hedw. Cotterill Clough, *Wilson.*

Homalia trichomanoides Brid. Marple, *Scholefield*!!

Pterygophyllum lucens Brid. Marple, *Scholefield*!! Patrick Wood and Higher Bebington (*M*). Staley Brushes!!

Leucodon sciuroides Schwgr. Cotterill Clough, *Wilson.*

Porotrichum alopecurum Mitt. Lower Bebington, *Flor. Liverpool.* Storeton, *Skellon.* Cotterill Clough and Marple, *Flor. Manch.*

Leskea polycarpa Ehrh. Hooton Park (*M*).

Anomodon viticulosus H. & T. Woods by the Bollin, *Wilson.*

Heterocladium heteropterum B. & S. Marple (*W*).

Thuidium Blandorii B. & S. Knutsford, *Wilson.*—*T. tamariscinum* B. & S. Marple (*W*). New Brighton!

Climacium dendroides W. & M. Marple (*W*). Newchurch Bog and Knutsford Moor, *Wilson.* New Brighton!!

Isothecium myurum Brid. Near Rock Ferry (*M*). Cotterill Clough, *Crozier.*

Pleuropus sericeus Dixon. Arden Hall and Hatherlow (*W*). Woods by the Bollin, *Wilson.* Bromboro!

Camptothecium lutescens B. & S. New Brighton! *Skellon.* Wallasey!!—*C. nitens* Schp. Knutsford Bog!! *Wilson.*

Brachythecium glareosum B. & S. Cotterill Clough, *Wilson.* Castle Mill, *Hobson.* Romiley (*W*). — *B. albicans* B. & S. New Brighton!! *Fl. Liverpool.* Wallasey!! — *B. salebrosum* B. & S. Bidston Moss (*M*). — *B. rutabulum* B. & S. Common. Moreton!! &c. — *Var. *longisetum* B. & S. Bidston!! A form like *var. *plumulosum* B. & S. is common at Wallasey!! — *B. campestre* B. & S. Newchurch, *Wilson.* — *B. rivulare* B. & S. Bebington and Patrick Wood (*M*). Cotterill Clough, *Crozier.* — *B. velutinum* B. & S. Common. Marple (*W*)!! Leasowe!! — *B. populeum* B. & S. Hollingworth and Marple (*W*). Hatherlow!! Wirral! — *B. plumosum* B. & S. Staley Brushes and Marple! (*W*). Patrick Wood (*M*).— *B. cæspitosum* Dixon. Frodsham, *Wilson.* Poolton (*M*).— *B. purum* Dixon. Common. Marple! &c.

Hyocomium flagellare B. & S. Staley Brushes!! and Hollingworth (*W*).

Eurhynchium prælongum B. & S. Marple (*W*)!! Wallasey!!—*E. Swartzii* Hobk. Marple! (*W*). Wirral!! — *E. pumilum* Schp. Marple (*W*). Bromboro (*M*). — **E. tenellum* Milde. Bromboro!! —*E. myosuroides* Schp. Bebington Wood, *Skellon.* — *E. striatum* B. & S. Frequent in Wirral (*M*).—*E. rusciforme* Milde. Wirral! (*M*). Hollingworth! Raby! — *E. murale* Milde. Marple (*W*). Lower Bebington (*M*).—*E. confertum* Milde. Marple!! (*W*). Leasowe!!—*E. megapolitanum* Milde. Prenton (*M*).

Plagiothecium depressum Dixon. Marple, with fruit, *Gordon &*

Whitehead !! Eastham !! — *P. Borrerianum* Spr. Staley Brushes (*W*). Hollingworth ! Alderley, *Flor. Manch.*—Var. *collinum* Wils. Alderley, *Wilson.* — **P. denticulatum* B. & S. Common. Staley Brushes ! Wallasey !! — *Var. *majus* Boul. Near Bidston !! — *P. sylvaticum* B. & S. Marple (*W*).—*P. undulatum* B. & S. Alderley, *Flor. Manch.* Staley Brushes (*W*). Eastham Wood, *Sansom.*

Amblystegium serpens B. & S. Dukinfield and Marple ! (*W*). Storeton ! *Skellon.* Common ! — (*A. radicale* P. Beauv. Marple, *Whitehead & Holt.* Poulton (*M*). I do not know which of the allied forms this refers to, and therefore bracket it for confirmation.) —*A. irriguum* B. & S. Hazel Grove, *Whitehead & Holt.*— *A. fluviatile* B. & S. Marple (*W*).—*A. filicinum* De Not. Dukinfield !! and Marple (*W*). Hartford Bridge, *Wilson.*

Hypnum riparium L. Dukinfield (*W*) ! Common !! — Var. *longifolium* Schpr. Near Macclesfield ! — **H. polygamum* Schp. Wallasey !!—*H. stellatum* Schreb. Marple Aqueduct (*W*). Knutsford, *Wilson.* Gillbrook (*M*). Brookhouse Moss (*C*) !!—*H. chrysophyllum* Brid. Grappenhall and Over, *Wilson.* Eastham (*M*).—*H. polymorphum* Wils. Grange Wood, *Wilson.* — *H. aduncum* Hedw. Near West Kirby !! — *H. Sendtneri* Schp. Hale Moss, *Hunt* !! — *H. fluitans* L. Baguley Moor, *Wilson.* Staley Brushes, Hollingworth, and Hale Moss !! (*W*). — *H. exannulatum* Gümb. Baguley Moor, *Wilson.* Staley Brushes (*W*). Hale Moss, *Cook* !! Abbott's Moss (*C*) !! — *H. uncinatum* Hedw. Hatherlow and Hattersley (*W*). Near Claughton (*M*). New Ferry, *Fisher.*— *H. vernicosum* Ldb. Wybunbury Bog, *Wilson.* — *H. revolvens* Sw. Staley Brushes ! (*W*). — *H. commutatum* Hedw. Romiley and Marple ! (*W*). Bidston and Bebington, *Skellon.*—*H. cupressiforme* L. Common. Storeton !! — *Var. *lacunosum* Brid. Wallasey !! — *Var. *ericetorum* B. & S. Marple (*W*) !! Storeton !! — Var. *resupinatum* Schp. Marple (*W*). Patrick Wood, *Skellon.* Bromboro and Eastham Wood (*M*).—*H. Patientiæ* Ldb. Staley Brushes, Hollingworth, and Romiley (*W*). — *H. molluscum* Hedw. Hale Moss and Cotterill Clough, *Manch. Flor.* Romiley (*W*). Bromboro and Egremont, *Skellon.* — *H. palustre* L. Marple, Hyde ! and Hazelgrove (*W*). — *H. ochracenm* Turn. Staley Brushes and Hollingworth, with fruit, *Whitehead & Scholefield* !! — *H. scorpioides* L. Baguley Moor, *Wilson.* Hale Moss, *Flor. Manch.* Brookhouse Moss (*C*) !!—*H. stramineum* Dicks. Staley Brushes !! (*W*). Brookhouse Moss (*C*) !! — *H. cordifolium* Hedw. Werneth Low (*W*). Bebington Heath (*M*). Handforth (*C*) !! Hattersley !! — *H. giganteum* Schp. Wybunbury Bog, *Wilson.* Hale Moss (*W*) !! Capesthorne (*C*) !!—*H. cuspidatum* L. Common ! Knutsford (*C*) !! —*H. Schreberi* Willd. Staley Brushes (*W*). Bidston Hill (*M*).

Hylocomium splendens B. & S. Cotterill Clough, *Wilson.* Marple ! (*W*). New Brighton, *Flor. Liverpool.*—*H. loreum* B. & S. Alderley Edge, *Flor. Manch.*—*H. squarrosum* B. & S. Staley Brushes (*W*). Near Sutton and Rockferry, with fruit (*M*). Common ! — *H. triquetrum* B. & S. Cotterill Clough, *Manch. Flor.* Marple and Disley (*W*).

In conclusion, I have to express my great indebtedness to Messrs. H. N. Dixon and M. B. Slater for much assistance in the determination of doubtful and critical plants.

THOMAS CLARK AND SOMERSET PLANTS.

By Harold Stuart Thompson.

As the name of Thomas Clark is omitted from the *Biographical Index of British and Irish Botanists*, and from the supplement now publishing, it may be well to give some notice of this accurate observer, with especial reference to his work in Somerset.

Born of a Quaker family who had lived in Mid-Somerset from late in the seventeenth century, Thomas Clark first saw the light at Greinton, Somerset, on November 16th, 1793, where his father, also a botanist, was engaged in farming his own land. He was educated at Thomas Thompson's school at Nether Compton, Dorset, and in 1817 came to Bridgwater. In 1833 he married Elizabeth Bull, of Street (Som.), and then built the pretty house at Wembdon, which he named Halesleigh, where on May 26th, 1864, he died.

Shortly after his death his large herbarium was unfortunately scattered, and part of it cannot now be traced; but I had an opportunity in 1891 of a hasty examination of the portion which still remained in the hands of a member of the family, and was allowed to take a large number of specimens as vouchers for old records. That collection proved to be of exceptional interest and of great value, for it contained good specimens of many Somersetshire plants which had been recorded by Clark's friend the Rev. J. C. Collins, of St. John's, Bridgwater, in the (Somerset) *Supplement* to Watson's *New Botanists' Guide*, 1837; some of which records had been doubted by subsequent students of Somersetshire botany, for the plants were not submitted to Mr. Watson for verification, and some had apparently become extinct.

Some years ago, through the kindness of the Rev. J. W. Collins, I was enabled to make a complete copy of the manuscript notes of Mr. Collins' late father, who made no herbarium, but added a series of pencil notes in a copy of vol. i. of the 3rd ed. of Hooker's *British Flora*, 1835. My object therefore is to use these notes in conjunction with the specimens from Clark's herbarium, and to attempt to throw some light upon a few of the hitherto doubted records of Collins in the *New Botanist's Guide;* for we know that Clark and Collins did much of their botanical work together. Thomas Clark was a member of the Botanical Society of London, contributed to the fourth volume of the *Phytologist* (1851–3), and one of the authorities quoted for Somerset and Dorset in *Topographical Botany;* he was also the "obliging correspondent" of Sir W. J. Hooker with reference to the appearance in Somerset of the two rare plants, *Aconitum Napellus*, still thriving luxuriantly in 1898, and *Melissa officinalis.*

In 1856 Clark contributed "A Catalogue of the Rarer Plants of the Turfmoors of Somerset" to the *Proceedings* of the Somersetshire Archæological and Natural History Society, of which he was a member. He had a most intimate and thorough knowledge of the moors at a period when their Flora was probably at its richest, and he seems to have noted down nearly all the interesting plants that were ever found there, and very few new discoveries remained upon the peat for those who came after him. He was unable to find some of the eighteenth century records of Sole, including *Parnassia* and *Helosciadium inundatum.* He describes Sole as being in the habit of paying annual visits to the moor, and says further that it is not likely that so experienced a botanist was in error as to any of the plants which he has recorded,—words applicable to Clark himself.

However, notwithstanding the advance of drainage and cultivation, there are few if any of Clark's Turfmoor plants which a careful search would not reveal today.

Being of a modest and retiring nature he seems to have been content with quietly working in his own way, corresponding only occasionally with the great botanists of his day; and he left it to his friend Collins to contribute the numerous records with which the latter is credited in *The New Botanist's Guide* (*Supplement*).

In the *Notes supplemental to the Flora of the Bristol Coalfield*, 1888, my kind friend Mr. J. W. White makes a suggestion to the effect that Collins may have mistaken *Papaver Argemone* for *P. hybridum* as growing "abundantly in fields at the mouth of the river Parret, at Steart and Burnham," for the latter species had not since been noticed. Good specimens of *P. hybridum* from Bridgwater as well as *P. Argemone* from Burnham were, however, found in Clark's herbarium; and it is gratifying to note that the former was rediscovered last summer, not far from the same district west of the Parret, by my friend the Rev. C. W. Whistler.

The great majority of Collins' records published in the *New Botanist's Guide* have been confirmed by actual specimens from Clark's herbarium, or by the observations of more recent botanists, but there are still some perplexing old records which want clearing up, and it would be very interesting to know if any of our readers can throw any light upon the following:—

Arabis stricta. "Cheddar; rocks on the Quantock Hills near Merridge. J. C. Collins MSS." Mr. Murray remarks in his excellent *Flora of Somerset*, "Almost certainly errors; probably *A. Sagittata*, D.C. was the plant intended."

Hutchinsia petræa. "Cheddar. J. C. Collins. MSS."

There is no reason why both these plants should not grow at Cheddar, in similar places to those at Bristol.

Brassica oleracea. "Berrow; Brean; Steep Holmes. J. C. Collins MSS."

Crambe maritima. "Burnham, on the coast near the church. J. C. Collins MSS."

Raphanus maritimus. "At the base of Brean Down towards Berrow, very rare. J. C. Collins MSS."

A specimen of the last named only occurs in Clark's herbarium from "the foot of Brean Down, 1835." The three plants want investigating on the Bristol Channel.

Dianthus deltoides. "On the lias near Street, J. C. Collins MSS."

Potentilla verna. "Frequent round Bridgwater, J. C. Collins MSS." Crooks Peak on Mendip, where I found it this spring for the first time, appears to be the nearest spot to Bridgwater.—*P. argentea.* "Frequent round Bridgwater, J. C. Collins MSS. Possibly a mistake, for this is not a plant likely to be lost if once well established.

Myrrhis odorata. "Hedges by the roadside between West Street, Bridgwater, and Enmore. J. Poole MSS." The Rev. J. Poole's notes were communicated by Mr. Collins, and I found "Enmore Road" given as the locality for this plant in Collins' MS. notes mentioned above. It may have got exterminated through building operations, but possibly *Anthriscus vulgaris*, which grows there, was mistaken for it.

Acorus Calamus. "Plentifully in King's Sedgemoor. J. C. Collins MSS." Withering also gives "Marshes near Glastonbury," but the plant is probably lost through the drainage of the Somersetshire moors.

Juncus maritimus. "Mouth of Parrett, in ditches; not unfrequent near the Channel. J. Collins MSS." After many years' searching this plant was found by Mr. White last year in two places in Berrow Marsh.

Elymus arenarius. "Burnham, Berrow and Steart. J. C. Collins MSS." This grass is now very rare on the coast, and it has probably been seen by very few people.

Without doubt there are many blanks and queries in *Topographical Botany*, ed. ii., for both Somerset North and South, which Clark might have filled up had he been living, and we must hope that some of these old and forgotten botanists will be given their due when a new edition appears.

Thomas Clark was not only a painstaking botanist but a most accurate one, and some of the labels attached to his plants show how scrupulously careful he was to describe their exact habitats.

His cousin John Aubrey Clark, of Street (b. 24 July, 1826; d. 4 Aug. 1890), was also a botanist and a man of great originality, who wrote some very creditable verses and essays. A surveyor by profession, he devoted much of his spare time to the study of Fungology, and he has left behind some valuable work, including a number of careful drawings of Fungi, with seasons, habitats, descriptions, &c. Two books of these drawings are now in the Library at Kew. He was in correspondence with Cooke, Berkeley, W. G. Smith, and other authorities of the time.

DECADES PLANTARUM NOVARUM AUSTRO-AFRICANARUM.

AUCTORE R. SCHLECHTER.

(Continued from p. 28.)

DECAS VIII.

71. **Heliophila Dodii,** sp. n. Herba annua, erecta, parum ramosa, 20–30 cm. alta; caule sparsissime scabrido-hispidulo, basin versus demum glabrato, distanter foliato; foliis erecto-patentibus subglabris, 3–5 cm. longis pinnatifidis, segmentis patentibus anguste linearibus acutis; racemo laxe plurifloro nudo; pedicellis erecto-patentibus demum refractis, filiformibus minute scabrido-hispidulis, floris æquilongis longioribusve; sepalis oblongis obtusis subglabris, margine submembranaceo-marginatis, 0·5 cm. longis; petalis roseis obovatis obtusis, 0·6–0·7 cm. longis; staminibus erectis, filamentis anguste linearibus, glabris, nudis; antheris lineari-oblongis apice glandula minuta apiculatis, basi sagittatis, 0·2 cm. longis; ovario tenuissime puberulo; stylo filiformi glabro; siliqua lineari vel lineari oblonga monilformi, glabra, 1–2 cm. longa, stylo subulato incrassato acutiusculo coronata, articulis ovatis; seminibus pallide brunneis suborbicularibus immarginatis.

In regione austro-occidentali: In clivis graminosis Montis Diaboli prope Capetown, Nov. 1895; *Capt. Wolley Dod*, No. 465.

Somewhat allied to *H. Eckloniana* Sond. and *H. affinis* Sond., from both of which it is distinguished by the thickened style and the pinnatipartite leaves. According to the collector, the plant seems rare, as only a single specimen was found growing in company with the next species, with which it has several points in common.

72. **Heliophila scabrida,** sp. n. Herba annua erecta, ramosa, 25–40 cm. alta; caule scabrido dimidio inferiore distanter foliato, basin versus demum glabrato; foliis erecto-patentibus subglabris, 3–5 cm. longis, superioribus linearibus, inferioribus pinnatifidis, segmentis patentibus linearibus acutis; racemis laxe plurifloris; pedicellis erecto-patentibus scabridis, filiformibus 0·7–1 cm. longis; sepalis oblongis obtusis minute scabridis, margine submembranaceo-marginatis, 0·5 cm. longis; petalis roseis obovatis obtusis, 0·7 cm. longis; staminibus erectis, filamentis filiformibus glabris, omnibus nudis, antheris linearibus, glandula minuta apiculatis, basi sagittatis, c. 1·5 mm. longis; ovario puberulo, stylo subfiliformi glabro; siliqua lineari, 1·5–3 cm. longa, c. 0·3 cm. lata, glabra, stylo incrassato obtusiusculo coronata; seminibus suborbicularibus, immarginatis, pallide brunneis.

In regione austro-occidentali: In clivis graminosis Montis Diaboli prope Capetown, Nov. 1895; *Capt. Wolley Dod*, No. 464.

Although, as said above, in several points agreeing with *H. Dodii*, the present species belongs to the section *Orthoselis*, where it should be placed in the neighbourhood of *H. pectinata* Burch., a small plant with rather different leaves and flowers.

73. **Pelargonium oppositifolium,** sp. n. Suffrutex flaccidus, e basi ramosus; ramis adscendentibus vel suberectis elongatis 1½–2 pedalibus, laxe foliatis, pilosis, teretiusculis; foliis oppositis petiolatis, patentibus, circuitu ovato-cordatis, obscure 3–5-lobulatis, margine serratis, pilis sericeis superne et subtus nervis puberulis, 3·5–4·5 cm. longis, basi 3·5–4 cm. latis, petiolo 1·5–2·5 cm. longo; stipulis minutis oblique lanceolatis acutis vel acuminatis, pilosis, pedunculis axillaribus, gracilibus, filiformibus pilosis, 2-floris, 2·5–3 cm. longis; pedicellis filiformibus pilosis 0·5–0·7 cm. longis; calycis tubo gracilis, segmentis lanceolatis acutis pilosis æquilongis vel sublongioris, sparsim piloso, 0·7–0·9 cm. longo; petalis oblanceolato-spathulatis obtusis, subæqualibus, inferioribus ungue tenuioribus, 1·3 cm. longis infra apicem 0·3 cm. latis; filamentis filiformibus roseis, calycis segmentis fere æquilongis; stylo filiformi glabro, stigmatibus filiformibus filamenta bene excedentibus, ovario tenuiter piloso, rostro sericeo-piloso.

In regione austro-orientali: In ripis rivulorum in sylvis montanis montis "Omaqua" in terra Orange Free State, alt. c. 6500 ped., Febr. 1896; *J. Thode.*

I propose a new section for this remarkable species, § *Oppositifolium*, and place it next to § *Peristera.*

74. **Adenandra Bodkinii,** sp. n. Fruticulus fere 2-pedalis erectus, ramosus; ramis erectis, villosis, teretibus, dense foliatis; foliis erecto-patentibus imbricatis, obovatis, basi in petiolum brevissimum angustatis, subtus glandulosis, superne glabris, margine denticulato glandulosis, 0·3–0·6 cm. longis, supra medium 0·2–0·4 cm. latis; floribus ad apices ramulorum singulis, subsessilibus, niveis, c. 1·3 cm. diametientibus; calyce fere 0·6 cm. longo, sparsim piloso, segmentis lanceolatis acutis, margine denticulato-glandulosis, dorso glandulis nonnullis elevatis ornatis; petalis e basi lineari-unguiculata suborbicularibus obtusissimis c. 0·9 cm. longis, lamina medio 0·7–0·8 cm. lata, utrinque glaberrimis; filamentis sterilibus subulatis glabris, abbreviatis, glandula minuta apiculatis; filamentis fertilibus subulatis glabris, sterilibus duplo longioribus, vix 1·5 mm. longis, antheris circuitu oblongis utrinque excisis, glandula minuta sessili subinconspicua apiculatis; stylo brevi, discum vix excedente; ovarii cornubus glandulis elevatis dense muricatis.

In regione austro-occidentali: In montibus Cederbergen prope montem "Sneeuwkop," alt. inter 3500 et 4500 ped., Oct. 1897; *A. A. Bodkin* (No. 8629 in herb. Bolus et proprio).

One of the many striking novelties which have come lately from the "Cederbergen" and "Kondelbergen," in the Clanwilliam district. Its nearest ally, as far as I can discover, is *A. ciliata* Sond. from Muizenberg.

75. **Berardia trigyna,** sp. n. Frutex pluripedalis, erectus, valde ramosus; ramulis filiformibus tomentosis, dense foliatis; foliis minutis, appressis, crassiusculis, lineari-oblongis apiculatis, dorso carinatis, arachnoideo-pilosis, demum glabrescentibus, mar-

gine puberulis, intus pilosis, 0·1 cm. longis; floribus ad apices ramulorum capitellatis, capitulis paucifloris subglobosis, interdum unifloris; bracteis foliis similibus pallidioribus; floribus sessilibus albidis, c. 0·2 cm. diametientibus; calyce villoso 0·1 cm. longo, segmentis oblongis obtusis tubo æquilongis, petalis duplo brevioribus; petalis oblongis obtusis glabris basin versus medio paullo incrassatis, 0·1 cm. longis; staminibus filiformibus glabris, petala haud æquantibus; stylis 3, filiformibus glabris, 0·5 mm. longis; ovario dense sericeo-villoso triloculato, loculis uniovulatis.

In regione austro-orientali: Juxta rivulos prope Murchison, Nataliæ, 12 Maio 1884; *J. M. Wood*, No. 3029. Juxta rivulos pone flumen Enkweni in terra Pondoland, Junio 1888; *Dr. F. Bachmann*, Nos. 1668, 1669, 1670, 1671, 1680.

As yet no species of *Berardia* has been found with three styles and a three-celled ovary. Although these characters are very remarkable in our species, I do not, however, feel justified in making a new genus, as in everything else our plant is a true *Berardia*. However, I propose to make it the type of a new section (*Berardiella*).

76. **Mesembryanthemum nubigenum**, sp. n. Suffrutex humilis, decumbens e basi ramosus; ramulis brevibus adscendentibus, teretiusculis, papulosis, foliatis; foliis patentibus vel erecto-patentibus, carnosis, oblongis vel oblongo-ellipticis acutis, basin versis angustatis, interdum linearibus, fide collectoris papulosis; floribus aurantiacis ad apices ramulorum solitariis, breviter pedicellatis; pedicello calyceque papuloso; calycis tubo late obconico, segmentis oblongis obtusis, petalis brevioribus, margine plus minus conspicue membranaceo-marginatis, interioribus exterioribus paulo brevioribus nunc suborbicularibus; petalis 1-seriatis linearibus obtusis 1-nerviis, 0·7 cm. longis, c. 0·2 cm. latis, calycis segmenta duplo fere excedentibus; staminibus subeffusis, calycis segmenta haud excedentibus, filamentis filiformibus glabris, antheris lineari-oblongis utrinque subexcisis, 0·2 cm. longis; stylis erectis, 5, subulatis acutis, 0·3 cm. longis, antherarum apices attingentibus.

In regione austro-occidentali: In rupium fissuris in cacumine montis "Mont aux Sources" in Terra Orange Free State, alt. c. 9500 ped., Jan. 1896; *J. Thode*.

For the present I consider the plant best put under next to the section *Crassulina;* it does not agree with any species of that section, but should form the type of a new one, *Nubigena*, characterized by rather flattish leaves, solitary yellow flowers, and a creeping habit.

77. **Euryops montanus**, sp. n. Fruticulus humilis, compactus, valde ramosus ½–1-pedalis; ramulis divaricatis, teretibus glabris, dense foliatis, demum basibus foliorum persistentibus obtectis; foliis, anguste linearibus acutis, textura crassiusculis, dorso carinatis, glabris, infra medium angustatis, basi sursum dilatatis, 0·5–0·8 cm. longis, medio latitudine 0·1 cm. vix excedentibus; florum capitulis, ad apices ramulorum sessilibus, terminalibus, solitariis, illis *E. multifidi* DC. vix majoribus; involucro late cylindrico, foliolis c. 8, alte connatis, apicibus liberis triangu-

laribus, margine tenuissime ciliatis, 0·6–0·7 cm. longo, c. 0·4 cm. diametiente; radii floribus, ligulatis, 7–8, apice minute tridentatis, 4-nerviis, involucrum duplo excedentibus, medio ligulæ 0·3 cm. latis, styli brachiis exsertis, acheniis glabris, pappo aspero; disci floribus paucis, tubulosis, glabris, involucro æquilongis, tubo dimidio inferiore cylindrico, superiore campanulato; staminibus apices laborum attingentibus, filamentis filiformibus, glabris, antheris linearibus filamento brevioribus, stylo filiformi glabro, staminibus breviore, achæniis pappoque florum radii.

In regione austro-orientali: In lapidosis in summa cacumine montis Mont aux Sources (montium Drakensbergen, Nataliæ), alt. c. 10,000 ped., Jan. 1896; *J. Thode.*

A most distinct little shrub, which is said to be the only firewood on the highest mountain-top of the Drakensbergen. It resembles in habit *E. calvescens* DC. and *E. multifidus* DC., but is well characterized by its undivided leaves.

78. **Stachys lasiocalyx,** sp. n. Suffrutex erectus, perennis, subsimplex, vel e basi parum ramosus, bene foliatis, 30–40 cm. altus; caule stricto 4-angulari, pilis stellatis tomentosulo; foliis oblongis vel obovato-oblongis obtusis, crenatis, basi in petiolum perbrevem attenuatis, sessilibusve, utrinque pilis stellatis tomentosulis, superne nunc demum subglabrescentibus, floralibus sensim decrescentibus patentibus; spica laxa, elongata, verticillis dissitis 2–4-floris; floribus roseis subsessilibus; calyce campanulato pilis stellatis tomentosulo 0·7–0·8 cm. longo, segmentis lanceolatis acuminatis, tubo brevioribus; corolla rosea, 1·1–1·2 cm. longa, extus stellato-piloso, intus glabra, tubo subcylindrico, labio superiore suborbiculari obtusissimo, 0·4 cm. diametiente, labio inferiore 0·6 cm. longo, 3-lobulato, lobulis lateralibus subpatentibus oblongis obtusiusculis, lobo intermedio multo majore semiorbiculari, obtusissimo; filamentis pilosulis, antheris oblongis subfalcatis, tubum excedentibus medium labii superioris vix attingentibus; stylo filiformi glabro, filamentis fere æquilongo; nucibus glabris.

In regione austro-orientali: In clivis graminosis montis "Mont aux Sources" in terra Orange Free State, alt. c. 8000 ped., Jan. 1896; *J. Thode.*

S. nigricans Bth., *S. simplex* Schltr., and *S. sessilis* Gürke form so distinct a group in habit that they might well be placed together in a section, *Simplicia.* Our species differs from the others by its leaves, the indument of the calyx, and the purple flowers.

79. **Hebenstreitia macrostylis,** sp. n. Herba annua, pusilla, erecta vel adscendens spithamæa, plus minus ramosa; ramis tereti-usculis, laxe foliatis, puberulis, vulgo tenuibus; foliis anguste linearibus basin versus angustatis, dimidio superiore margine paucidentatis, interdum integris, 1–1·5 cm. longis, medio fere 0·1–0·2 cm. latis, internodiis vulgo brevioribus; spicis elongatis, multifloris, illis *H. repentis* Jarocz. similibus, cylindricis, pollicaribus et ultra, 0·7–0·8 cm. diametientibus; bracteis patentibus e basi ovata vel lanceolata linearibus, subrecurvis, glabris, nunc flores excedentibus, nunc æquantibus; calyce ovato, membranaceo, 1·5–2 mm. longo;

corolla lactea 0·4 cm. longa, glabra, antice usque ad medium fissa, apice quadrilobo, lobis oblongis; antheris subquadrato-oblongis, basi apiceque excisis; stylo filiformi, glabro, basi incrassato, apicem corollæ vulgo æquante; fructu subglobosa, acheniis, vix æqualibus ovati obtusis, marginibus incurvis, intus excavatis, medio longitudinaliter carina ornatis, c. 0·2 cm. longis.

In regione austro-occidentali: In arenosis prope Clanwilliam, alt. c. 350 ped., Aug. 1896 (exemplar unicum); *R. Schlechter.* In sabulosis Peninsulæ Capensis, anno 1897; *Capt. Wolley Dod.*

Unfortunately I have lost the ticket of Capt. Wolley Dod's plant; however, I remember that it came from the Cape Peninsula. The nearest ally to our species seems *H. repens* Jarocz., with which it agrees in its general appearance, although it grows more upright. The long filiform style seems a constant and good mark of the plant.

80. **Romulea Thodei**, sp. n. Herba pusilla, bulbosa, vix spithamæa; cormo ovoideo tunicis tenuibus apice fissis, dense obtecto, c. 1 cm. diametiente; foliis paucis (in speciminibus visis 2) lineari-setaceis, erectis rigidiusculis, 10–20 cm. longis; scapis filiformibus glabris, vix ancipitibus, foliis brevioribus; spathæ valvis lanceolatis acutis margine anguste membranaceo-marginatis, c. 1·5 cm. longis; perigonio subcampanulato, c. 1·5 cm. longo, segmentis oblongo-ellipticis subacutis, tubo 0·5 cm. longo, infundibulari; antheris linearibus, basi breviter sagittatis, 0·3 cm. longis, dimidium segmentorum vix excedentibus, filamentis, subfiliformibus liberis, dimidio inferiore minute subauriculato-puberulis, tubo medio fere affixis; stylo filiformi, glabro, 1 cm. longo, brachiis filiformibus, tertia parte apice bifidis, 1·5 mm. longis, apices antherarum vix attingentibus; ovario ovoideo glabro.

In regione austro-orientali: In arenosis humidis, in planitie montis "Mont aux Sources" in terra Orange Free State, alt. c. 9200 ped., Jan. 1896; *J. Thode.*

As yet I have not heard of any other *Romulea* in South Africa as far east as the above; it is allied to *R. rosea* Baker, from the South-western Cape Colony, but distinguished by fewer leaves and the proportionately longer corolla-tubes. Whether constantly the number of leaves is only two, I cannot say with certainty; my three specimens only bear two each.

The genus *Romulea* and also *Lachenalia* badly want revision; their species of late have been extensively confused.

SHORT NOTES.

Tilia cordata Miller, Dict. no. 1. (1768).—This plant seems to have been frequently misunderstood. Dr. Simonkai, in his revision of this genus (Magyar Ak. Math. és Termesz. Közl. xxii. p. 327, 1888), has followed Maximowicz in considering *T. cordata* as coming from Amurland and Mandschuria, and apparently restricted to these districts. This seems a somewhat erratic view to take, as

Miller, the author of the species, expressly states that it "grows naturally in the woods in many parts of England." British botanists have generally considered *Tilia cordata* Miller as synonymous with *T. ulmifolia* Scopoli (=*T. parvifolia* Ehrh.), the reason for this being no doubt because Miller quotes as a synonym *Tilia fœmina folio minore* Bauhin, *Pinax*, p. 426. Miller's description is unfortunately very brief, but there can be no doubt from his type-specimen in the Banksian Herbarium that his plant is synonymous with *T. platyphyllos* Scopoli, *Fl. Carn.* ed. 2. i. 373 (1772), *sensu lato.* Miller's diagnosis runs as follows: "*Tilia* (*cordata*) *foliis cordatis acuminatis, fructibus quinquæ locularibus tomentosis*"; and the woolly fruits, as he translates it, characterize better *T. platyphyllos* than *T. ulmifolia.* In Miller's type the leaves are asymmetrically suborbicular cordate, serrate, acuminate, pubescent below; petioles pubescent; cymes 3-4-flowered; fruits elliptical or subelliptical, with a thick pericarp, tomentose, rather large. Dr. Simonkai, *l. c.*, retains *T. platyphyllos* Scop. and *T. grandifolia* Ehrh. as distinct species, the former inhabiting Central and Southern Europe, and only the latter reaching Britain; but this view has not been adopted by the authors of several of the more recent critical floras (Beck, *Fl. Nieder-Oesterreich*, p. 534; Rouy and Foucaud, *Fl. de France*, iv. p. 21); and *T. grandifolia* seems better placed as a variety only of *T. platyphyllos.* *T. cordata* Maxim. *non* Miller—a very distinct species, which has been carefully described by Dr. Simonkai *l. c.*—is thus unprovided with a name; it may be called T. MAXIMOWICZII.—E. G. BAKER.

A PERTHSHIRE NOTE.—In the recently published *Flora of Perthshire* I read with some astonishment that I have observed a number of plants at "Kilmadeck." As a matter of fact, I never got one of the plants in question there, but I did get all of them in the parish of that name. I think it is to be regretted that Dr. White and his editor should have known so little of their ground as to confound an old church and its precincts with a parish which covers sixty-four square miles. In every instance the entry ought to read "parish of Kilmadeck." I was asked to furnish Dr. White with a complete flora of the parish; I did my best to do so, but Kilmadeck as a "station" was never referred to.—A. CRAIG CHRISTIE.

BROMUS INTERRUPTUS.—I found this plant in an arable field near Uxbridge, Middlesex; and also with *B. secalinus* and *B. hordeaceus* in a field with sainfoin between Denham and Denham Marsh; and in the greatest abundance in a sainfoin field near Princes Risborough, Bucks, when I gathered over a hundred specimens in the area of a few yards. In neither instance did it show any gradation towards *B. hordeaceus.*—G. CLARIDGE DRUCE.

OPHRYS APIFERA × ARANIFERA IN WEST KENT.—Mr. G. L. Bruce has kindly sent me fresh specimens of a plant lately found in some quantity near Otford by the Toynbee Hall Natural History Society, growing with abundance of *O. apifera.* In habit these approach *O. aranifera*, the floral characters being very much what one would expect from a blending of the two species. The lip has a long, triangular-acute terminal lobe, abruptly deflexed at a right angle. It evidently comes near to *O. Trollii* Heg., which I have for some time past suspected to be this hybrid. I have myself seen *O. apifera*, *O. aranifera*, and *O. Arachnites* in bloom on the same day at Folkestone; so that this solution presents no special difficulty.—EDWARD S. MARSHALL.

BIBLIOGRAPHICAL NOTE.—In Prof. Saccardo's extremely useful volume *La Botanica in Italia* (under Bennett) is entered "Narrative of whaling voyage etc. London 1833–36 (a pag. 327–395 catalogo descrittivo delle piante raccolte in Toscana)." It seems on the face of it odd that Tuscany should be visited on a whaling expedition, but the explanation will be found in the actual title of the list as given in F. D. Bennett's book—"A Descriptive Catalogue of the Plants collected during the Tuscan's Voyage."—JAMES BRITTEN.

SPHAGNUM AUSTINI.—On examining a bit of the turf (peat) brought to this town to be sold for fuel, I found a *Sphagnum* having the triangular chlorophyllose cells and long papillæ of *S. Austini* Sull. The latter character was striking even under a one-inch power. This "turf," as it is commonly called here, is from Whixall Moss, but whether that part in Salop or Flint I do not know, nor the depth at which it was cut. This moss being very rare in Britain and usually found near the sea coast, the fact of its occurrence in the locality named is interesting and suggestive.—W. P. HAMILTON.

NORTH HANTS MOSSES.—The following additions to the list of Mosses for North Hants (v. c. 12) as given p. 262 Journ. Bot. may be noted from the Grange Park:—*Encalypta streptocarpa* Hedw.; *Eurhynchium Teesdalii* Schp.; *Weisia verticillata* Brid. Specimens of the first have been seen by Mr. A. Gepp, and Mr. H. N. Dixon has kindly named the other two.—W. L. W. EYRE.

CATHARINEA TENELLA IN BRITAIN.—Whilst botanizing in the neighbourhood of Goudhurst, Kent, last May, some male plants of *Catharinea* were found, which proved on examination to belong to *C. tenella* Röhl. On a subsequent visit to the locality, I found some female plants of the same species. These were quite young, with very short stems, and had evidently not been preceded by a male inflorescence. This proved the dioicous inflorescence of the plant, one of the chief specific characters of *C. tenella*. As both male and female plants occur, it may be hoped that fruiting specimens will be found later, especially as *C. tenella* fruits freely on the Continent, where it is not uncommon. *C. tenella* has for a long time been expected to occur in Britain, and has several times been erroneously recorded, dwarfed forms of *C. undulata* (L.) Web. Mohr. having been mistaken for it (see Braithwaite's *Brit. Moss. Fl.* i. p. 41). I hope in a future number of this Journal to give an illustration of the Goudhurst plant, and to make some further remarks on the species. Dr. Braithwaite and Mr. Dixon confirm my determination of the plant.—ERNEST S. SALMON.

Veronica Anagallis L. — This plant is usually perennial or biennial, and as such, with its stem from 1–3 ft. high, is familiar to British botanists; the annual form is very different, and at first sight looks like a very distinct species, at least as seen in July of this year in flower and fruit on the dried-up margin of a reservoir near Tring. The stem was slender, simple, 2–4½ inches high; the leaves oval or obovate and mostly narrowed towards the base; the flowers rather few and arranged in a lax terminal raceme, or very rarely there was a second axillary raceme; and the style was about as long as the emarginate capsule. Its synonymy is as follows:—

Veronica Anagallis ▽ L. *Sp. Pl.* p. 12 (1753), var. *montioides* Boiss. *Fl. Orient.* iv. p. 437 (1879).

V. montioides Boiss. *Diagn. Pl. Or. Nov.*, ser. 1, no. 7, p. 43 (1846). *V. pusilla* Benth. in DC. *Prodr.* x. p. 468 (1846).

This form has been reported from the Caucasus, from Persia, from Western Tibet, and from Afghanistan; but I am not aware that it has been noticed and recorded for Britain.—W. P. Hiern.

Plantago Coronopus var. ceratophyllum.—I enclose herewith a specimen of what appears to me to be *Plantago Coronopus* var. *ceratophyllum* Hoffm. & Link, as described by Mr. E. G. Baker and figured in Journ. Bot. for July last. It is abundant at Blackpool, West Lancs. (v. c. 60), where it grows with a smaller form having the leaves appressed to the ground, and a more slender root. Its discovery here appears to considerably extend its range to the north. Mr. Baker has seen the specimen. Last week I found *Urtica dioica* var. *angustifolia* Blytt growing plentifully in Ince Blundell Woods, South Lancs. (v.-c. 59). This has not been recorded previously for the vice-county, and is in every respect a similar plant to the one I distributed from Cheshire in 1894, which was passed as correctly named by Mr. A. Bennett (*vide* Bot. Exch. Club. Report, 1894).—J. A. Wheldon.

NOTICES OF BOOKS.

The Flora of Perthshire. By Francis Buchanan W. White, M.D., F.L.S. Edited, with an introduction and life of the author, a list of his scientific publications, and an appendix, by James W. H. Trail, A.M., M.D., F.R.S. With portrait and map. Edinburgh: W. Blackwood & Sons. 8vo, pp. lix, 407. Price 7s. 6d. net.

In this outcome of Dr. Buchanan White's labours of many years, we have the first county flora for Scotland which is worthy to rank as of equal importance with the best examples for England. Our local floras are becoming so bulky, owing to the inclusion in them of more or less irrelevant matter, and to an over-elaboration of details, that it is refreshing to come upon one which is confined strictly to its subject. In this respect the *Flora of Perthshire* approximates to the *Flora of Plymouth*, which we regard as a model for books of its class; and although we should have been glad to have had more biographical details as to former workers, we are inclined to condone their omission in face of the excellent botanical notes which the volume contains.

The introductory matter, after a modest preface by the editor, Prof. Trail, contains a paper "On the Origin of the Flora of Perthshire," by Dr. Buchanan White, of whom a memoir (with portrait) and bibliography follows; then comes the introduction proper, dealing with the divisions and physical features of the county, the method employed to show distribution, and earliest records. These have every appearance of being well and carefully done; in any case they can only be criticized by one possessing a knowledge of the county which the present reviewer cannot claim. After the Flora proper (which is limited to the flowering plants, ferns, and *Characeæ*) comes an appendix, in which are enumerated such papers bearing on the flora as have appeared since Dr. White's death, and other "information derived from various sources," which we are inclined to regret that the editor did not incorporate, or at least indicate, in the body of the work, as it is at present in danger of being overlooked. The index deserves a word of commendation, as it includes the names of species as well as of genera. Other matters which deserve a word of praise are the careful and excellent printing of the book and its moderate price. The nomenclature is mainly that of the last edition of the *London Catalogue*.

In certain genera the editor acknowledges help from specialists —*e. g.* to Mr. F. J. Hanbury and the Messrs. Groves for *Hieracium* and the *Characeæ* respectively, the Rev. E. S. Marshall for *Epilobium*, and Mr. Arthur Bennett for *Potamogeton*. Certain others, left incomplete by the author, have been elaborated by the editor and by Mr. W. Barclay. The *Rubi* were seen and annotated by the late Prof. Babington, and the Roses by Mr. J. G. Baker and Mr. Nicholson, whose withdrawal from active work among British plants is much to be regretted; the late views of the Rev. W. Moyle Rogers and of Prof. Crépin on these genera are referred to in the Appendix. The notes on the *Carices* seem very careful and interesting.

The British Museum Herbarium has been consulted, but the material it affords is by no means exhausted, especially as to the very interesting specimens from Robert Brown and his contemporary the Rev. William McRitchie, minister of Cluny, which sometimes supplement the information given in the *Flora*. Thus Brown is quoted as saying of *Ranunculus Flammula* var. *pseudoreptans* (in the Linnean Society's Herbarium): "It is undoubtedly nothing more than a variety of *R. Flammula*, as Haller has well observed. I have a set of specimens that put this matter beyond a doubt. August 1793." This set of specimens is in the British Museum. Under *Silene anglica* we read in the *Flora:* "In Withering's Herbarium there is a label (written by R. Brown?) which records *S. anglica* as . . . . in Perthshire." In the British Museum Herbarium is a specimen from McRitchie labelled "5 August 1793. Mr. Brown found it in the parish of Clunie in the farm of Newmill in a field of barley." *Subularia* is quoted from the Linnean Society's Herbarium as found in the Loch of Cluny by Brown; McRitchie has the following note in Herb. Mus. Brit.: "24 Sept. 1793. Mr. Brown on his arrival here in the beginning of August detected two plants of it near the E. shore of the loch of Clunie. I have since found it in abundance on the W. side near the Castle hill in about 5 feet water." There is little doubt that a careful search in the Herbarium would reveal further contributions from these early collectors, as well as other matters of interest—such, for instance, as Don's original specimens of *Veronica saxatilis* from Ben Lawers and Meall Ghaordie, from which the figure in *English Botany* was drawn.

The interesting notes under *Arabis petræa* show the careful observation which Dr. White bestowed upon the critical species which came under his notice, and also the judicious modesty which led him to refrain from bestowing a name upon every form which presented points of distinction. This indeed is noticeable throughout the book; forms which by some authors would, on far slighter grounds, at once be printed with a new name, are observed; a note upon them, sufficient to attract the attention of later observers, is placed on record; and there the matter is left. If this plan were always followed, nomenclature would be less copious and less puzzling than it is at present. This Perthshire form of *A. petræa*, for example, has received no fewer than three names from one botanist, not one of which can stand, even if the plant should in the future be regarded as specifically distinct, as it has been in the past. Mr. Druce in the Exchange Club Report for 1892 first named it as *A. petræa* var. *grandifolia*, and then claimed for it specific distinctness: it "may be described as distinct as *grandifolia*; should there already be a plant so named, I would suggest the name of *A. scotica*." If this principle of naming were generally followed, there would be no limit to the number of names that might be "suggested." In this instance, however, Mr. Arthur Bennett (Journ. Bot. 1894, 114) promptly identified the plant with one described as *A. ambigua* by De Candolle (Syst. ii. 231) in 1819, and referred to *A. petræa* as a variety (var. *ambigua*) by Fries in his third *Mantissa* (1842).

A similar unwillingness to maintain names for mere forms may be noted under *Castalia speciosa*, where Dr. White says: "Flowers variable in size and stigma rays in number, without a relative correspondence. Hence there seems to be no valid reason for separating the small-flowered form as a variety. Plants inhabiting the highland lochs have usually the smallest flowers; large-flowered plants in lowland ponds have generally been introduced." He inclines, however, to consider that *Barbarea arcuata* Reich. "deserves at least sub-specific rank"; as to *B. vulgaris* he is "far from convinced" that it "is anything more than an introduced plant with us, or at the best a weed of cultivation." In some cases Dr. White is disposed to think plants which have been regarded as introductions may have claims to nativity; thus he says of *Cheiranthus:* "so abundant on the precipices of several of our trap hills that, if the general opinion of botanists were not unfavourable to [its] being considered a native of Britain, it might well be thought to be indigenous there." *Butomus*, "though usually reported to be a naturalized plant only in Scotland," is, he thinks, "there is little doubt, indigenous in Perthshire."

The records of stations for rare plants are often accompanied by a caution, which even in these enlightened days is unfortunately by no means unnecessary, as to the moderation which should be observed by collectors. Thus under *Saxifraga cernua* we read: "It is to be hoped that botanists, when taking specimens, will bear in mind that the limited station on Ben Lawers is the only place in Britain for this plant. The Craig-na-Caillich station seems to be lost." "There is a danger of *Phyllodoce cærulea* being exterminated" from its well-known station, but Dr. White says, "although the 'rediscovery' of this rare plant has been more than once announced, I am not aware that those who know where to look for it have ever failed to find it." As to *Moneses*, "owing to the reckless manner in which specimens have been taken by botanists and others, the plant is now nearly extinct at Scone, and appears to flower but rarely." A probable loss is *Scheuchzeria*, which, Dr. White very much fears, "owing to the altered condition of the locality, has become extinct in the White Myre, and hence can be no longer included in the Perthshire list." Certain introductions seem likely to become permanent additions to the flora, such as *Sedum album*, which increases with remarkable rapidity. "A small piece was planted on the precipice of Kinnoul Hill, and in a few years multiplied to such an extent as to cover for a considerable distance all the ledges of a rock more than 100 ft. in height." On *Poa palustris* L. we find the following note: "Discovered in 1889 by Mr. William Barclay among the rank vegetation on the mud banks bordering the Tay below Perth, and Bennieby Pond near Crieff. Mr. Barclay thinks there is not sufficient evidence for certainty as to this species being native in Perthshire. It had not been previously found in Britain."

For many other notes of interest we must refer our readers to the book itself, which we trust may be the forerunner of other carefully executed floras of Scottish counties, for which it may well serve as a model.

James Britten.

Practical Plant Physiology. By. Dr. W. Detmer. Translated from the second German edition by S. A. Moor, M.A. 8vo, pp. xix, 555. With 184 illustrations. London: Sonnenschein.

Dr. Detmer's *Pflanzenphysiologische Praktikum*, the second and revised edition of which appeared in 1895, is so well known to workers in plant-physiology as to need no word of commendation. It is the only book dealing exhaustively with the subject, and when we state that Mr. Moor has found no sufficient reason for addition or alteration, and has presented in its entirety a translation of this edition, the scope of Messrs. Sonnenschein's latest contribution to our botanical library is at once apparent. Under such circumstances the advertisement of the book under a joint authorship, which seems to imply a revised edition rather than a translation, is hardly fair. In referring to the work as to some extent unique, we do not forget Mr. Francis Darwin's invaluable little laboratory guide included in the Cambridge Natural Science Manuals. We should welcome a more exhaustive work on somewhat similar lines from the Cambridge laboratory; for though Dr. Detmer's book gives an excellent account of the subject, the arrangement is by no means best suited for laboratory work. It is in fact more of the nature of a text-book. Nevertheless English teachers and students will doubtless be glad to have the careful translation which Mr. Moor provides for them under Messrs. Sonnenschein's auspices.

A. B. R.

Lehrbuch der Botanik für Hochschulen. Von Drs. E. Strasburger, F. Noll, H. Schenck, and A. F. W. Schimper. Dritte verbesserte Auflage. 8vo, pp. viii, 570, figs. 617 (part coloured). Fischer, Jena. 1898. Price 7 M. 50 Pf. (paper); 8 M. 50 Pf. (bound).

The third edition of this extraordinarily cheap but admirable text-book has appeared simultaneously with the English translation of a former edition. We have already called attention to the striking contrast in the prices of the book as offered to German and English students respectively, and will only express another word of envy for the former on behalf of the latter. The small increase in size noticeable in the third edition of this Lehrbuch is due mainly to the additional figures, a large proportion of which are coloured, and illustrate officinal as well as poisonous plants. The new coloured pictures are, on the whole, better than those of previous editions, and their effect is to render highly attractive Prof. Schimper's section in the special botany of seed-plants. The most important alterations occur in Prof. Strasburger's introduction to morphology, where account is taken of recent advances, or modifications of views previously held, in cytology. The section on physiology wants bringing up to date; in the chemistry of assimilation it is often wofully behind the times. The portion dealing with the special botany of the Cryptogams is not sufficiently full, the Bryophyta especially receiving but scanty treatment.

A. B. R.

The Making of a Daisy; Wheat out of Lilies, and other studies in Plant-life. A Popular Introduction to Botany. By Eleanor Hughes-Gibb. 8vo, pp. 126, with 20 figs. in the text. London: Griffins. 1898. Price 2s. 6d.

Under this somewhat cumbersome title Mrs. Hughes-Gibb has written for children a bright little introduction to the study of flowers. To trace the succession of plant life from the tree-ferns and lycopods of the carboniferous period to the daisy of our lawns and meadows, in about twenty small pages of good-sized print and in language which shall appeal to a child's mind, requires no little skill. This is, however, what the author attempts, and does with very fair success in her second chapter. To comprehend a theory of evolution it is necessary to get an idea of the wonderful plasticity of plants. In tracing the origin of the two groups, Dicotyledons and Monocotyledons, and suggesting their numerous secondary modifications, Mrs. Gibbs has admirably succeeded in conveying this idea; though we must take exception to the figure of the leaves of *Plantago major* as an ally of the lilies (obviously in error for the water plantain). It is not the custom now-a-days to combine theology and natural science, and a reference to the Creator may seem to some out of place in a text-book. But no wise parent will quarrel with the marked expression of a spirit of reverence which pervades this little volume, and detracts not in the least from the value of a theory of evolution.

A. B. R.

Garden Making. By L. H. Bailey. London & New York: Macmillan & Co. 4s. — *The Pruning Book.* Same author and publishers. 5s.

Prof. Bailey continues to add to his popular "Garden Craft" series of books on practical gardening, and the two works now under notice are by no means the least interesting of his efforts. In his own popular style, the author has given us in *Garden Making* an excellent treatise on the establishment, arrangement, and cultivation of gardens for flowers, fruits, and vegetables, and the most important operations in each section are ably described. Although written primarily for American gardeners, the book may well find a place in the library of every British gardener whose duties consist in the management of mixed gardens. The *Pruning Book* is an important treatise on an important subject, and although perhaps there is little new to be said, Prof. Bailey has succeeded in giving a charm to it chiefly by means of his original method of treatment. He conclusively shows that pruning is a most necessary operation, and has most beneficial results when properly practised. It is safe to say that every line in the 530 pages (which have 331 illustrations) is worth careful reading.

J. W.

ARTICLES IN JOURNALS.[*]

Bot. Centralblatt (Nos. 27, 28).—E. H. L. Krause, 'Floristische Notizen: Cyperaceen.' — (No. 28). A. J. Ewart, 'Can isolated Chloroplastids continue to assimilate?' — (No. 29). E. H. L. Krause, 'Helobiæ and Pandanales.'

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[*] The dates assigned to the numbers are those which appear on their covers or title-pages, but it must not always be inferred that this is the actual date of publication.

Bull. de l'Herb. Boissier (4 July). — C. de Candolle, 'Piperaceæ Sodiroanæ.'—H. Schinz, 'Beiträge zur Kenntniss der Afrikanischen Flora' (*Convolvulaceæ*, H. Hallier; *Labiatæ*, M. Gürke; *Compositæ*, &c., H. Schinz).—E. v. Halácsy, 'Die bisher bekannten *Centaurea*-arten Griechenlands.' — H. Hallier, 'Neue und bemerkenswerte Pflanzen aus dem malaiisch-papuanischen Inselmeer' (concl.).—H. Solereder, '*Buddleia Geisseana.*' — A. Pestalozzi, 'Die Gattung *Boscia.*'

Bull. Soc. Bot. France (xlv. pt. 1: June).—G. Dismier, 'Flore bryologique des environs de Paris.' — M. Gandoger, 'Notes sur la flore espagnole.' — D. Clos, 'De la place dans la classification du groupe des Sanguisorbées.' — M. Fliche, 'Notes sur la flore de l'Yonne.'—E. Bescherelle, 'Florule Bryologique de Tahiti.'

Erythea (27 June). — A. Eastwood, Plants of Nob Hill, San Francisco.

Gardeners' Chronicle (25 June). — G. Henslow, 'History of the Radish' (2 pl.).—*Stapelia longidens* (fig. 3).

Journ. Linn. Soc. (Bot.)—(1 July). H. & J. Groves, 'Characeæ collected by Mr. T. B. Blow in the West Indies' (*Nitella dictyosperma*, sp. n.; 1 pl.). — F. N. Williams, 'Revision of *Arenaria.*'—W. C. Worsdell, 'Comparative Anatomy of certain Cycadaceæ' (1 pl.). — G. C. Druce, '*Carex helvola* in Britain.' — C. Reid, '*Limnocarpus*, a new genus of fossil plants from the Tertiary Deposits of Hampshire.'—D. H. Campbell, 'Structure and development of *Dendroceros*' (2 pl.).

Oesterr. Bot. Zeitschrift (July).—F. Bubák, *Synchitrium Niesslii*, sp. n. — F. Buchenau, '*Luzula campestris* und verwandte Arten' (cont.: 1 plate). — J. Freyn, 'Zur Flora von Ober-Steiermark' (cont.).—T. Wulff, 'Studien über verstopfte Spaltöffnungen' (1 pl.). —J. Murr, 'Die Pilosellorden Oberösterreichs.' — V. v. Cypers, 'Zur Flora des Riesengebirges' (concl.).

BOOK-NOTES, NEWS, &c.

Continuations of three important works have lately come to hand: Part v. of M. Cogniaux' monograph of the *Orchidaceæ* of the *Flora Brasiliensis;* a new part of the *Icones Floræ Germanicæ*, containing the *Saxifragaceæ;* and the concluding part of Teil iii. of Engler & Prantl's *Pflanzenfamilien*, containing the *Cornaceæ* and the conclusion of the *Umbelliferæ.*

We have received the first part of *Natal Plants*, by Messrs. J. M. Wood and M. S. Evans—a quarto publication issued at Durban (Bennett & Davis, 68, Field Street). It contains fifty somewhat roughly executed but accurate plates, with accompanying descriptions, and should prove very useful to those interested in South African botany, whether in the field or in the herbarium. The work is to some extent subsidized by the Cape Government, and a second part is promised; its continuance thereafter will depend upon the amount of support received, which we hope will be sufficient to render the undertaking permanent. No new species are described, but a great many have never been previously figured. The descriptions are in English, and in many instances include interesting notes upon the local uses of the species described. The preface, in which the purpose of the work is set forward, would have been the better for a revision from a literary point of view; the editors express a hope that "a full Flora of Natal" will "ere long be published"—a hope which we trust will receive speedy fulfilment.

We learn from the Kew *Bulletin* that Sir Henry Collett is preparing a flora of Simla and the district, which is to be illustrated by 200 figures in the text, from drawings by Miss Smith. The total number of species included is estimated at about 1500.

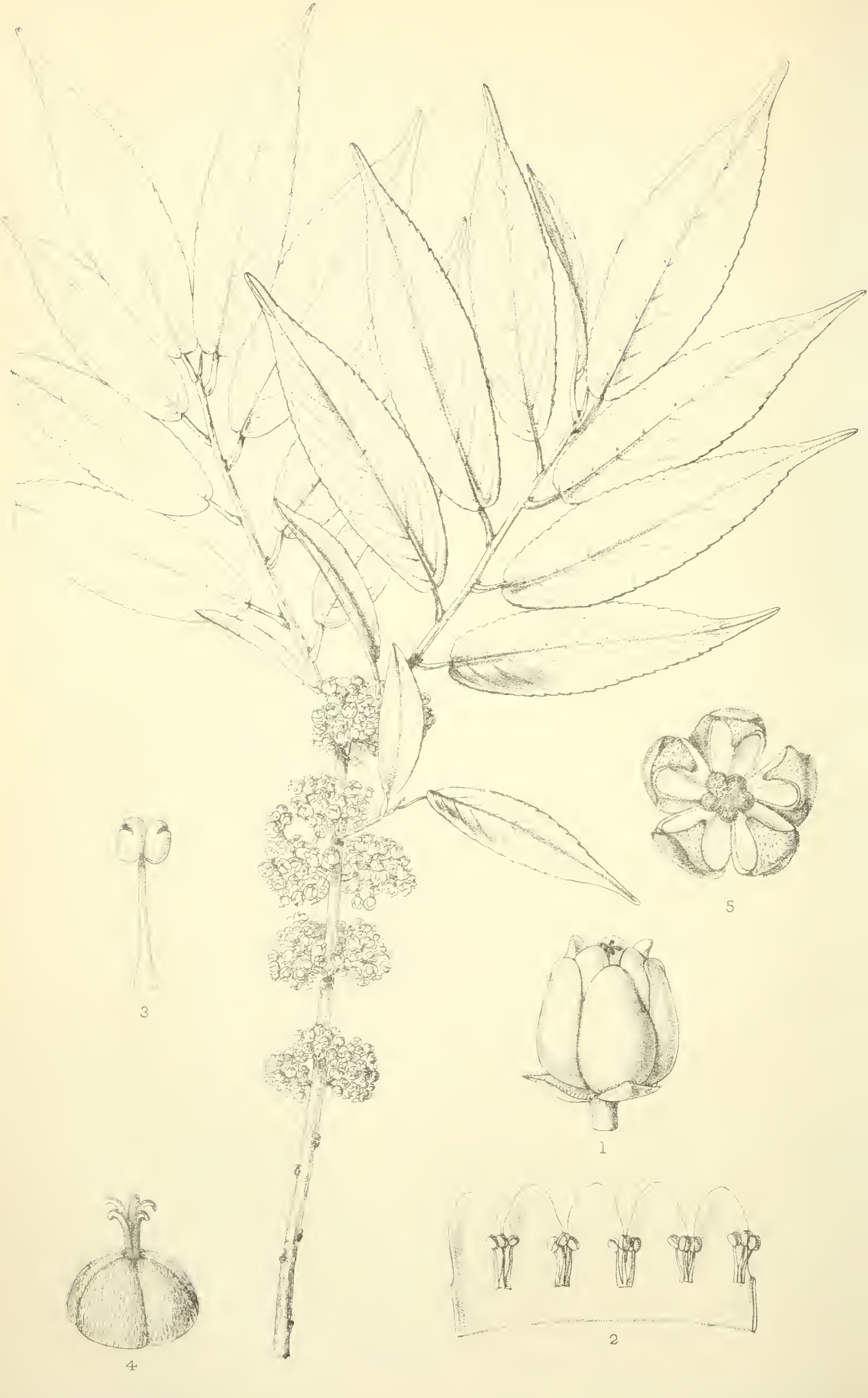
The "April and May" number of the Kew *Bulletin*, published in June, contains a paper on the botany of the Ashanti Expedition (1895-6) by Surgeon-Captain H. A. Cummins, in which six new species are described and a new genus of Menispermaceæ (*Rhopalandria* Stapf) is established. So many African plants are now published almost simultaneously that it is important to call attention to the fact that the ostensible date of publication of the Kew *Bulletin* is systematically inaccurate, and that the only approximation to accuracy is to be found in the Stationery Office date at the foot of the first page of each issue.

We are glad to learn that steady progress is being made with the *Flora of Kent*, which is now in type as far as *Sambucus*.

The June part (No. 3) of the *Notes* from the Botanical School of Trinity College, Dublin, contains two papers on transpiration and a paper on rhizoids of *Lunularia cruciata* by Dr. H. H. Dixon, and a note by Prof. Perceval Wright on the occurrence of "*Cyclaminus persica*" in North Africa: no reason is given for the adoption of this form of the name.

The first instalment of Durand & Schinz's *Conspectus Floræ Africæ* (Ranunculaceæ—Frankeniaceæ) has appeared. We hope to notice it later.

In his "Notes on Cambridgeshire Plants" in the last number of this Journal, Mr. W. West, jun., refers to the existence of an annotated copy of Babington's *Flora of Cambridgeshire*, which the late Professor kept in what really was his private room at the Cambridge Herbarium. There students were at liberty to consult it. This copy is now in Mrs. Babington's possession; and in a letter she expresses her willingness to help any students of the Cambridgeshire flora by still allowing them to consult it. Any who wish to do so should write to her at 5, Brookside, Cambridge.



R. Morgan del et lith. West, Newman imp

Ficalhoa laurifolia. *Hiern.*

A NEW GENUS OF ERICACEÆ FROM ANGOLA.

By W. P. Hiern, M.A.

(Plate 390.)

Ficalhoa Hiern, gen. nov.

Calyx liber late campanulatus 5-partitus persistens, segmentis late ovatis apice rotundatis in æstivatione leviter imbricatis quincuncialibus in fructu fere immutatis. Corolla brevis suburceolaris calycem parum excedens profunde 5-loba tarde decidua, lobis late ovalibus apice rotundatis subpatulis basi erectis imbricatis quincuncialibus cum calycis segmentis alternantibus. Stamina 15 uniserialia inter se libera glabra prope corollæ tubi brevis apicem inserta in corollâ inclusa per tria cum corollæ lobis alternantia subapproximata, filamentis carnosulis erectis quam corollæ lobi bis brevioribus e basi latâ attenuatis, antheris brevibus utrinque emarginatis bilocularibus basifixis demum poris oblique apicalibus dehiscentibus. Discus inconspicuus annularis vel fere obsoletus. Ovarium subhemisphæricum obtuse pentagonum carnosulum pilosum 5-loculare apice centraliter intrusum, stylo centrali brevi glabro, stigmate glabro primum ovoideo-capitato brevissimo deinde ovario æquilongo in ramos 5 divergentes diviso, ovulis numerosis minimis placentis carnosis spongiosisve centralibus adscendentibus infra medium insertis. Capsula hemisphærica dura loculicide 5-valvis, septis durescentibus calycis segmentis oppositis, seminibus pluribus parvis irregulariter ovoideis compressiusculis, testâ laxe reticulatâ, albumine tenui, nucleo recto crassiusculo terete quam semen tertio breviore.

Arbuscula glabriuscula, ramis teretibus, foliis alternis exstipulatis simplicibus serrulatis, floribus hermaphroditis albis in paniculis densis brevibus axillaribus vel lateralibus dispositis.

F. laurifolia, sp. unica. Arbor 2–6 m. alta, parce comosa, laxa, vage ramosa, sempervirens; trunco 2 dm. diam.; ramis glabris, patentibus; ramulis subgracilibus, foliosis, demum nutantibus; foliis ovali- vel ovato-oblongis, apice acuminatis, basi obtusis, subcoriaceis, lucidulis, super saturate viridibus glabris vel hinc inde minute glanduloso-lepidotis, infra pallidis parce præsertim secus costam prominentem pilosis minute glanduloso-lepidotis, margine subcartilagineo obtuse serrulatis, 5–12 cm. longis, 1–3 cm. latis, pinnatinervibus, nervis inconspicuis; petiolo sæpissime glabro, 3–8 mm. longo; floribus pentameris, 3–4 mm. longis, fere regularibus, pedicellis brevibus vel brevissimis puberulis pilosisve crassiusculis suffultis, in paniculis contractis 2–3 cm. diam. dispositis; calyce sæpius basi bibracteolato, bracteolis ovalibus vel late ovatis obtusis sæpius ciliolatis calyce bis brevioribus; calycis segmentis ciliolatis, 3 mm. longis; corollâ 3 mm. longâ, albâ, glabrâ; stylo unacum ramis stigmatosis demum 2 mm. longo; ovario dense breviter piloso; capsulâ 3 mm. diam., calyci adpresso æquilongâ; seminibus pallidulis, c. ½ mm. longis; nucleo albido, c. ⅓ mm. longo.

Habitat in distr. Huilla a cl. Welwitsch anno 1859 collecta in sylvis montanis humidiusculis prope Lopollo ad cataractas sporadica cum fl. m. Dec., n. 4808; etiam in sylvis raris inter Mumpulla et Nene cum fr. m. Oct., n. 4809.

Occasionally the pistil is hexamerous, and the filaments are sometimes bent at the apex.

The genus is related to *Agauria* DC., but stands apart by the grouping of its more numerous stamens, by the broader shape of its corolla, and by the toothing of its foliage.

The name is given in honour of Count Ficalho, Professor of Botany and Director of the Botanical Garden of the Polytechnic School at Lisbon, &c., my friend and fellow-worker on African plants.

Explanation of Plate 390. — *Ficalhoa laurifolia.* The principal figure is reduced about one-half. Fig. 1. The flower with the bracteoles at its base and with its short pedicel, enlarged about 6 diameters. 2. Inside view of spread-out corolla, enlarged about 6 diameters. 3. A single stamen, enlarged about 18 diameters. 4. The ovary with the style and stigmas, enlarged about 6 diameters. 5. The dehisced capsule as seen from above, enlarged about 6 diameters.

NOTES ON FRESHWATER ALGÆ.

By W. West, F.L.S., and G. S. West, B.A., A.R.C.S.

The following notes have been accumulating for some time; they are somewhat varied, consisting of descriptions of new species, notes relating to distribution, critical remarks, &c.

1. Sphæroplea annulina (Roth) Ag. In very fine condition with ripe oospores.

Hab. Urumi, Persia.

2. **Hormospora ordinata**, sp. n. H. parvum; cellulis parvis, subremotis, late ellipticis et longitudinaliter dispositis, diametro 1·3-plo longioribus; segmentis amplis, achrois. Long. cell. 7·5 μ; lat. cell. 5·8 μ; crass. teg. 15 μ.

Hab. Cam Fell, W. Yorkshire.

The small size of the cells, their remoteness, and comparative shortness sufficiently differentiate this species. The cell-contents are bright green and very granulose.

3. Zygnema (Zygogonium) Heydrichii Schmidle, Zur Entwickl. Zygn. u. Calothrix, *Flora*, 1897, Bd. 84, Heft 2, 167–170, t. v. f. 5–11. As we have previously remarked (Ann. Bot. xii. no. xlv. Mar. 1898, 44, footnote), this species seems to be nothing more than a laterally conjugated form of *Zygnema spontaneum* Nordst. The vegetative cells and the zygospores are of the same dimensions, and the latter are also marked with scrobiculations precisely in the same way as those of *Z. spontaneum*. (Compare Schmidle, *l. c.* f. 11, and West & G. S. West in Ann. Bot. xii. pl. v. f. 60, 61, 1898.)

4. Gonatozygon sexspiniferum W. B. Turner in Journ. Roy. Micr. Soc. 940, pl. xvi. f. 27, 1885. This plant is not a Desmid,

but one of the *Diatomaceæ*. We possess the original specimens from which Turner described the species, and find both his description and figures to be lacking in accuracy. The rows of spines which he described and figured are but markings on the valve, and by varying the focus they can be seen somewhat as he drew them (though less exaggerated). He says, "forming long filaments"; the diatom is probably a species of *Desmogonium*, and occurs in filaments, some of which are branched. Also "spines arranged longitudinally in six linear series" is not correct, there being only four series of markings on the valve.

5. SPIROTÆNIA MINUTA Thur. var. EBORACENSIS, var. n. Var. cellulis brevioribus, apicibus subrotundatis, anfractibus chlorophori 3–4. Long. 30–32 μ; lat. 7–8 μ.

Hab. Cam Fell, W. Yorkshire, not uncommon amongst *Cylindrocystis crassa*, *Penium digitus*, *Hyalotheca dissiliens*, &c., in peat bogs.

This variety is relatively shorter in proportion to its breadth than the type; it has also blunter ends and more turns of the chromatophore. The figures given by Lütkemüller (Oesterr. botan. Zeitschr. 1895, t. i. f. 21) also show more turns of the chromatophore (up to 4½) than are described for this species.

6. **Spirotænia fusiformis**, sp. n. S. parva, elongata; cellulis rectis vel sæpe leviter obliquis, diametro 10–12-plo longioribus, cylindrico-fusiformibus, apices versus attenuatis, apicibus acutis sed rotundatis; chlorophoris singulis, parietalibus, subirregulariter dispositis, de polo ad polum extensis, circiter anfractu dimidio. Long. 42–58 μ; lat. 4·3–4·6 μ.

Hab. In peaty pools, amongst *Sphagnum cuspidatum* var. *plumosum*, Cowgill Wold Moss, Widdale Fell, W. Yorkshire.

The cells were solitary or in pairs (after division), and occurred somewhat sparsely among a large quantity of *Arthrodesmus Incus*. The cells were evidently surrounded by an almost invisible mucus, the extent of which could not readily be ascertained on account of its extreme transparency. It was very difficult to determine the precise nature of the chromatophore, because of its irregularity and the small size of the plant; it only made from half to three-quarters of a turn, and the protoplasm (outside the chromatophore) contained some large granules.

It is distinguished from *S. tenerrima* Arch. (= *S. gracillima* Arch.) by its greater diameter, its comparatively shorter cells, and its very different chromatophore.

7. **Spirotænia turfosa**, sp. n. S. mediocris; cellulis subcylindricis, elongatis, subrectis vel leviter curvatis, diametro circiter 12-plo longioribus, utroque polo gradatim attenuatis, apicibus obtusis; chlorophoris singulis, parietalibus, anfractibus 1½–2, pyrenoidibus minutis et sparsis. Long. 100–102 μ; lat. 7·5–8·5 μ; lat. apic. circ. 4 μ.

Hab. In peaty pools, Ilkley, W. Yorkshire.

This appears to come nearest to *S. parvula* Arch., but is of much larger size, is proportionately longer, has more rounded and relatively wider ends, and has more turns of the chromatophore. It differs from *S. fusiformis* in its larger size, its more rounded poles, and in having more turns of the chromatophore.

8. **Mesotænium purpureum**, sp. n. M. cellulis libere natantibus, cylindricis et leviter curvatis, polis rotundatis, diametro $3\frac{1}{2}$–$4\frac{1}{2}$-plo longioribus; chromatophoris in medio cellularum non interruptis, purpureis. Long. 32–46 μ; lat. 9·5–10 μ.

Hab. Peat bogs, Old Cote Moor, W. Yorkshire.

The protoplasm was full of granules of various sizes, in addition to the pyrenoids, the latter being scattered.

9. PENIUM CUTICULARE West & G. S. West in Journ. Roy. Micr. Soc. 1896, 153, t. iv. f. 43, 44. Prof. Schmidle states (*Nuova Notarisia*, 1897, 69) that this species is identical with *P. cylindrus* Bréb. var. *subtruncatum* Schmidle, var. *coloratum* Schmidle, Oesterr. botan. Zeitschr. t. xiv. f. 27, 28. This may be so, but at the same time we may state that it is not a variety of *P. cylindrus*. He also states that it is near *P. Lewisii* W. B. Turner, but *P. Lewisii* = *P. exiguum* West, forma *Lewisii*; and although *P. cuticulare* is near *P. exiguum*, we yet think that these two species are sufficiently distinct, *P. cuticulare* differing from *P. exiguum* in being somewhat larger, in never being constricted in the middle, in never having dilated apices, as well as in its red-brown cell-membrane.

10. CLOSTERIUM PSEUDOSPIROTÆNIUM Lemmermann, var. VARIABILE Lemmermann, Zur Algenfl. des Riesengebirges, Forschungsberichte aus der Biol. Stat. Plön, iv. Theil, 1896, 119, cum fig. 12–14. This presents many resemblances to forms of *Rhaphidium*, being almost identical with *R. polymorphum* var. *mirabile* West & G. S. West, Journ. Roy. Micr. Soc. 1897, 501, pl. vii. f. 9–13. Lemmermann does not state whether or not there is an apical locellus with moving corpuscles in his species. This, if regularly present, is a diagnostic feature of *Closterium*, yet *R. polymorphum* var. *mirabile* sometimes possesses a solitary moving corpuscle.

11. CLOSTERIUM COLORATUM (Klebs) Gutw. Rosprawy Akad. Umiej. Krakow. Wydzial. mat.-przyr. xxxiii. 38, t. v. f. 16, t. 6, f. 16 (1896). This species seems to differ very little, if any, from *C. lunula* var. *intermedium* Gutw. (*l. c.* t. vi. f. 17), and should be regarded merely as a variety (v. *coloratum* Klebs) of *C. lunula*.

12. CLOSTERIUM CORDANUM Gutw. *l. c.* 40, t. vi. f. 19. This seems to us but a form of *C. Malinvernianum* De Not with rather thicker apices.

13. CLOSTERIUM GALICIENSE Gutw. *l. c.* 39, t. vi. f. 18. We consider this also to be but a form of *C. moniliferum* (Bory) Ehrenb. with thicker apices.

14. PLEUROTÆNIUM ANNULATUM (Josh.). *Docidium annulatum* Josh. in Journ. Linn. Soc. bot. xxi. 651, t. xxv. f. 13 (1886). *D. egregium* W. B. Turner in K. Sv. Vet.-Akad. Handl. Bd. 25, no. 5, 34, t. ii. f. 14, 15 (1893). Having recently examined some of the original specimens of *D. annulatum* Josh., we were surprised

to find they did not agree with Joshua's description and figures in several particulars, but that they agreed much better with *D. egregium* W. B. Turner. Turner's species is undoubtedly the same as that of Joshua, and is more correctly described and figured, yet Joshua's name has the priority, and we must regard *D. egregium* as a synonym of *Pleurotænium annulatum*. The somewhat rounded, smooth areas ("annuli" of Turner) are the thinnest parts of the cell-membrane, as in the case of *Pleurotænium trochiscum* West & G. S. West; they are arranged in almost straight or somewhat oblique longitudinal series, not quite so irregular as those figured by Turner, and of somewhat greater area also. Turner's fig. 15 is more correct than his fig. 14 or than that of Joshua, in the light of the specimens we have examined.

15. Docidium costatum Wolle, Desm. U. S. 53, t. x. f. 2 (1884). This "species" is not a Desmid, but a portion of some aquatic arthropod. We found many of these structures, corresponding to Wolle's "semicells," in material received from him. He also remarks under his description (*l. c.*): "The specimens which came under my observation were not vegetative—too old; this species needs verification." Yet his figures are coloured green!

16. Euastrum rostratum Ralfs, var. præmorsum Nordst. in K. Vet.-Akad. Handl. xxii. 34, pl. iii. f. 7 (1888). A form almost agreeing with that figured by Borge, Austral. Süssw.-alg., Bih. till K. Sv. Vet.-Akad. Handl. Bd. 22, Afd. iii. no. 9, 1896, t. i. f. 13, but without the two scrobiculations on each semicell.

Hab. Rangoon, British Burmah.

17. Euastrum Turneri De Wildem. Obs. critiq. quelq. espèc. Desmid., Ann. d. l. soc. belg. de microsc. [Mémoires], t. xviii. 1894. Under this name M. de Wildeman unites *E. spinosum* Wolle, *E. Nordstedtianum* Wolle, and *E. quincunciale* W. B. Turner. Why should a new name be created for a species already possessing one? Apart from this, there is already an *Euastrum Turneri* West in Journ. Linn. Soc. bot. xxix. 141, pl. xx. f. 18 (1892). We have already proved *E. Nordstedtianum* Wolle to be *E. evolutum* (Nordst.) West & G. S. West (Cfr. Journ. Linn. Soc. bot. xxxiii. 290, fig. xylogr. 1, 1898). *E. spinosum* Wolle may be a form of this, or may not, Wolle's figures being too indistinct and inaccurate to determine this point. The figures of *E. quincunciale* given by W. B. Turner show that it is not a form of *E. evolutum*, the surface markings being so different.

18. Cosmarium doliforme West & G. S. West in Trans. Linn. Soc. bot. ser. 2, v. 246, pl. xv. f. 16 (1896). Schmidle, in *Nuova Notarisia*, 1897, 70, states that this is the same as *Dysphinctium parvulum* var. *undulatum* Schmidle in Oesterr. botan. Zeitschr. 1895, 348, t. xv. f. 7. We are quite sure that *C. doliforme* has no relationship to *C. parvulum*, being much nearer to *C. pyramidatum*. We may, however, state that *D. parvulum* var. *undulatum* is identical with *C. tetragonum* var. *pumilum* West in Journ. Roy. Micr. Soc. 5, pl. i. f. 19, 1894, although larger, and we are now of the opinion that the latter should be placed under *C. parvulum*.

19. COSMARIUM HAMMERI Reinsch, forma ABSCISSA Schmidle in *Hedwigia*, xxxiv. 302, t. iv. f. 8 (1895). This form should certainly be placed under *C. retusiforme* (Wille) Gutw., as its characters agree much more closely with the latter than with *C. Hammeri*. The large basal angles of the semicells, the hollow on each side immediately under the apex, the sharp apical angles, and the straight apex, are characters which are essentially those of *C. retusiforme*.

20. COSMARIUM HEIMERLII West & G. S. West (*C. minutissimum* Heimerl, non Arch.), var. TUMIDUM, var. n. Var. angulis rotundioribus; a vertice visis in medio utrobique inflatis. Long. 9–10 μ; lat. 10–11·5 μ; lat. isthm. 2·5–3 μ; crass. 5·5 μ.

Hab. West and North Yorkshire, in several localities.

21. COSMARIUM NASUTUM Nordst. Zygospora globosa, spinis brevis uncinatis obsessa, spina unaquaque ex base mamillata orienti.

Hab. Cowgill Wold Moss, Widdale Fell, W. Yorkshire (with zygospores).

22. SPONDYLOSIUM PAPILLOSUM West & G. S. West in Trans. Linn. Soc. bot. ser. 2, v. 43, pl. ix. f. 19, 1895. Schmidle states in *Nuova Notarisia*, 1897, 69, that this species is the same as "*Sphærozosma* (*Spondylosium*) *depressum* (Bréb.) Rabenh." From his references he has evidently been guided by the remarks concerning the latter in Rabenhorst's Fl. Europ. Alg., De Toni's Sylloge Algar., and Kirchner, Mikr. Pflanz. d. Süssw. Theil I. 21, t. ii. f. 61, 1891, and not to have consulted the original *Spondylosium depressum* Bréb. (Kütz. Spec. Alg. 189; Mém. Sciences Nat. Cherbourg, iv. t. i. f. 1, 1856). Rabenhorst says, "cellulis . . . tuberculis tribus marginalibus," but Brébisson's figure shows three tubercles within the apex and extending across the surface of each semicell. What does Rabenhorst mean by "marginalibus"? Kirchner evidently thought he meant *lateral margins*, and figured a plant under the name of *Spondylosium depressum*, which is certainly *Spondylosium papillosum*.

23. STAURASTRUM VARIABILE Wildem. in Ann. soc. belg. microsc. [Mémoires], 1894, t. xviii. Under this name M. de Wildeman unites *S. unicorne* W. B. Turner, *S. ecorne* W. B. Turner, and *S. scolapacinum* W. B. Turner. Even if these three be accepted as varieties of one species, why place them under a new name? Surely the literature of the subject is sufficiently intricate without the addition of a new and useless name. If M. de Wildeman wished to alter Turner's species, he should have adopted one of his specific names and placed the other two under it as varieties.

24. STAURASTRUM QUADRANGULARE Bréb. var. ALATUM Wille. The form figured by Schmidle in *Hedwigia*, Bd. xxxvi. 23, cum fig. iv. 2, 1897, is *S. contectum* W. B. Turner, var. *inevolutum* W. B. Turner. The var. *alatum* described and figured by Wille (Bih. till K. Sv. Vet.-Akad. Handl. viii. 21, t. i. f. 41) is also probably a form of *S. contectum*, but this cannot be definitely determined from his figure.

25. STAURASTRUM FURCIGERUM Bréb. var. CRASSUM Schröder, Forschungsberichten d. Plöner Biol. Stat. v. 32, t. iv. f. 6, 1897.

This is a large form of *S. montanum* Racib. Nonn. Desm. Polon., Pamietnik Akad. Umiej. w Krakowie, Wydz. Matem.-prz. x. t. xii. f. 11 (1885). The latter, however, appears to be only a stout small form of *S. fuscigerum* Bréb., and should be called var. *montanum* (Racib.).

26. ARTHRODESMUS HEXAGONUS Boldt, var. TETRASPINOSUS Schröder. *l. c.* 29, t. iii. f. 5 (1897). This is a rounded form of *Xanthidium concinnum* Arch. var. *Boldtiana* West in Journ. Linn. Soc. bot. xxix. 167, pl. xxii. f. 6 (1892). We think there is need to emphasize the fact that *Arthrodesmus hexagonus* Boldt (1885) is identical with *Xanthidium concinnum* Arch. (1883), and also that Archer placed the plant under the correct genus. We have recently given good figures of *X. concinnum* (Cfr. Journ. Roy. Micr. Soc. 1897, pl. vi. f. 15).

27. ARTHRODESMUS LAPEZYNSKII Gutw. in Rosprawy Akad. Umiej. Krakow. Wydz. mat.-przyr. t. xxxiii. 57, t. vii. f. 68, 1896. This seems to us but a variety of *A. octocornis* Ehrenb. possessing a few minute additional spines. The sides of the semicells are not more retuse than those of many forms of *A. octocornis*, especially American forms.

28. SELENOSPHÆRIUM HATHORIS Cohn, in Festschr. d. Naturf. Ges. zu Halle, t. xi. f. 16, 17, 1879.

Hab. Harvey Lake, Pa., U.S.A.

These were very fine specimens, and formed large cœnobia.

29. DACTYLOCOCCUS BICAUDATUS A. Br. var. SUBRAMOSUM, var. n. Var. minor, cellulis minus attenuatis, concatenatis et subramosis. Crass. cell. 3·8–6·5 μ.

Hab. Forming a green stratum on dripping rocks, Mossdale Moor, Widdale Fell, N. Yorkshire.

30. **Scenedesmus spicatus**, sp. n. S. cellulis plerumque binis, ellipticis, diametro circiter 2 plo longioribus, supra marginem exteriori serie spinarum brevium 6–7 præditis. Long. cell. 7·5–9 μ; lat. cell. 4 μ; long. spin. 2–2·5 μ.

Hab. In a pond, Saltburn, N. Yorkshire.

31. RHAPHIDIUM POLYMORPHUM Fresen. var. SPIRALE, var. n. Var. cellulis solitariis, spiraliformibus, anfractibus 1–1½; apiculis acutissimis.

Hab. Hawksworth, W. Yorkshire; in immense quantity amongst *Myriophyllum spicatum*. Also Pilmoor, near Thirsk, N. Yorkshire.

32. **Oocystis parva**, sp. n. O. minuta; cellulis plerumque solitariis vel in familiis 2–4 cellularum consociatis; cellulis plerumque oblique ellipsoideis, 1½–1¾-plo longioribus quam latioribus, apicibus subacutis et non incrassatis; membrana firma. Contentum chlorophyllosum cellularum in massis parietalibus 2–3. Long. cell. 6–12 μ; lat. cell. 4–7 μ; long. teg. 13·5–29 μ; lat. 10·5–18 μ.

Hab. Pilmoor, near Thirsk, N. Yorkshire; abundant in pools.

This species occurred in quantity amongst other small algæ, and appears to be distinctive; its small size, its somewhat obliquely elliptical cells, and its few chromatophores distinguish it. The cells are usually solitary, and generally have a well-defined integument surrounding them, which appears to arise by splitting off the the cell-membrane.

It comes nearest to *O. pusilla* Hansg., from which it differs in the obliquely elliptical cells with more pointed ends, its greater relative breadth, and in the solitary cells being as a rule enclosed in a well-marked integument.

33. **Tetraedron floridense**, sp. n. T. mediocre, subirregulariter octoëdricum, marginibus leviter convexis, angulis bifidis, divisione unaquaque producta, mamillata et subuncinato, cum spina acuta subcurvata prædita; membrana tenue et glabra. Diam. sine spin. 34–44 μ, cum spin. 44–59 μ; long. spin. 3·8–5 μ.

Hab. De Land, Florida, U.S.A.

34. Tetraedron minimum (A. Br.) Hansg.

Hab. Urumi, Persia.

Stipitococcus, gen. n.

Cellulæ epiphyticæ, gregariæ, minutæ, stipite hyalino tenuissimo longo affixæ, base subrotundata, apice sæpe apiculato, nonnunquam producto deinde irregulariter expanso, a vertice visæ circulares; contentus cellularum læte viridis, chromatophora singula parietalia curvata et irregulari, plasma granulosa. Propagatio ignota.

35. **S. urceolatus**, sp. unica. Character idem ac generis. Lat. cell. 3–4·2 μ, altit. 6·5–10·5 μ; long. stip. hyal. 4–6 μ.

Hab. Oughtershaw Tarn, W. Yorkshire (1800 ft.); epiphytic on *Mougeotia* sp.

This interesting alga occurred in large numbers closely clustered round some filaments of *Mougeotia;* it seems to be allied to the genus *Peroniella* Gobi (Scripta Botan., Horti Univer. Imper. Petropolitanæ, tom. i. [1866–7] 244–250, t. i), which is an epiphyte on filamentous *Desmidiaceæ* (e. g. *P. hyalothecæ*), but is, however, much smaller and of a different form, the expanded and irregular apex being remarkable. The stalk is extremely hyaline, in fact barely visible, and it is very likely, on account of its extreme tenacity, that it was originally formed from the single cilium of a zoospore, as in *Peroniella*, although it is comparatively much shorter. There was no trace of a lateral crack for the escape of the zoospores, as in *Peroniella*, and it is more probable that they would escape from the expanded apex of the cells. The measurements of *Peroniella* in De Toni's *Sylloge Algarum* appear to be wrong, according to Gobi's figures (*l. c.*).

36. Kirchneriella obesa (West) Schmidle, var. pygmæa, var. n. Var. minor, cellulis angustioribus et minus curvatis. Crass, cell. 2 μ.

Hab. Keighley Moor, W. Yorkshire. This is a very marked variety.

37. Pleurococcus rufescens (Kütz.) Bréb. var. sanguineus, var. n. Var. in stratum mucosum densum molle, colore læte sanguineus; contentum cellularum granulosum et læte sanguineum. Diam. cell. 11–20 μ.

Hab. Cowside Beck, Arncliffe, W. Yorkshire.

This occurred in large brilliant blood-red patches, covering those stones and rocks which could not be displaced by the usual rapidity of the current, and which are often left dry. Some few cells had about a fourth part of the contents still green.

38. CALOTHRIX BALEARICA Born. & Flah. var. TENUIS, var. n. A variety with the filaments only about half the thickness of those of the type. The filaments are very tortuose and intricate, and heterocysts are absent. Crass. trich. 3·5–5 μ.

Hab. Simon's Fell, W. Yorkshire.

39. OSCILLATORIA IRRIGUA Kütz.

Hab. Vehar Lake, Parel, Bombay.

40. **Clonothrix gracillima**, sp. n. C. trichomatibus angustissimis, alteratim pseudoramosis, nunquam attenuatis; pseudoramis flexuosis, elongatis et alternatim psudoramulosis; vaginis tenuibus, firmis, arctis et achrois; cellulis diametro 3–4-plo longioribus; cytioplasmate læte ærugineo. Crass. trich. 1·5 μ.

Hab. In horse-trough, Shipley, W. Yorkshire; also Pilmoor, near Thirsk, N. Yorkshire.

The false ramification of this plant is most peculiar; the apparent branches seem to be merely tangentially applied at their bases to the primary filaments, and are of the same thickness. The "branches" appear to arise by the lateral protrusion of a few cells from the sheath, these cells remain attached laterally, and grow quite independently into long flexible filaments. The cells were often seen to have left the sheath, the latter being empty for some distance.

The only other species of this genus is *C. fusca* E. Roze (Journ. de Botanique, Oct. 1896, 329), from which it is distinguished by its much narrower trichomes of uniform thickness, its more elongate false-ramifications, and by its bright blue-green colour. We had noticed this plant as belonging to a genus hitherto undescribed some time before the publication of *Clonothrix* by M. E. Roze.

41. **Dactylococcopsis montana**, sp. n. D. cellulis solitariis vel in familiis 4–16 (circ.) associatis; cellulis ellipticis, doliformibus vel obliquis, cum polis attenuatis et leviter rotundatis ad extremum, diametro circiter 2–3-plo longioribus; cellulis familiarum plerumque inter se distantibus, post divisionem approximatis; cytioplasmate pallide ærugineo. Long. cell. 8·6–11·5 μ; lat. cell. 3·5–4 μ.

Hab. Cowgill Wold Moss, Widdale Fell, and Keighley Moor, W. Yorkshire.

The form of the cells readily distinguishes this species from *D. rupestris* Hansg. and *D. rhaphidioides* Hansg. It also has a different habitat, and the families of cells, which appear to be surrounded by a small amount of mucus, attain a somewhat larger size than in either of the two species mentioned. The cell-walls are very firm, and the division of the cells is in one direction only, being somewhat oblique (as in *Dactylococcus!*). The chromatophore does not entirely fill the cell, there being a clear space near to one margin (also as in *Dactylococcus!*); there is also a more or less conspicuous granule towards each end of the chromatophore.

42. CLATHROCYSTIS ÆRUGINOSA (Kütz.) Henfrey.

Hab. Vehar Lake, Parel, Bombay. Exceptionally fine specimens. Temperature of water 87° Fahr.

NOTES FROM CANTIRE.

By C. E. SALMON.

THE following notes upon plants collected in Cantire (v. c. 101) are the results of a little collecting there in August, 1897, in the neighbourhood of Ardrishaig, on the Crinan Canal, which forms the boundary between Argyll and Cantire.

The Rev. W. Moyle Rogers kindly named the *Rubi*, and to Mr. Arthur Bennett I am also much indebted.

An asterisk denotes a new record for the vice-county.

Rubus suberectus* Anders. Near Inverneil. — **R. Lindleianus* Lees. By Crinan Canal, Ardrishaig. — **R. rhamnifolius*, form. Near Cairnbaan. The Rev. W. Moyle Rogers remarks upon this: "Apparently identical with a form which is frequent on the commons south of London, and which I have also from Warwickshire (Bagnall) and L. Corrib, Ireland (Marshall). I have always thought it a strongly marked small form of the very aggregate *R. rhamnifolius* W. & N., though in some few features (armature and panicle) recalling *R. Selmeri* Lindeb., under which (as var. *microphyllus* Lindeb. = *R. villicaulis* var. *alienus* Murbeck in Aresch. "Some observ.," p. 152) Mr. Gelert would place it. Dr. Focke in 1893 expressed a general agreement with my view (with a Barnes Common specimen before him), and in 1897 sent Mr. Marshall the following note on his L. Corrib specimen: "*R. rhamnifolius* var. *exilis*, a small-leaved form analogous to *Rosa exilis* Crép. and several *Rubi*."—R. pulcherrimus* Neum. By Crinan Canal, Auchindarroch.—**R. dumnoniensis* Bab. Roadside near Inverneil Farm. —**R. villicaulis* Koehl. var. *Selmeri* (Lindeb.). By Crinan Canal, Ardrishaig.—**R. radula* Weihe var. *anglicanus* Rogers. Near Inverneil. Of this Mr. Rogers says: "I think this must go under my var. *anglicanus* of *R. radula* Weihe, but it has thicker foliage and still less *radula*-like armature than our S. England form, and perhaps goes a step away from it towards *R. Babingtonii* Bell Salt. I have seen the same or a very similar plant growing in the counties of Perth and Dumbarton."—**R. corylifolius* Sm. var. *cyclophyllus* Lindeb. By Loch Killisport, near Achahoish. "I think rightly named." W. M. R.

**Alchemilla vulgaris* L. var. *alpestris* (Schmidt). By Crinan Canal, Ardrishaig. *Fide* Rev. E. F. Linton.

**Agrimonia Eupatoria* L. About Ardrishaig.

**Pyrus Aria* Ehrh.—By Canal, Ardrishaig.

Callitriche hamulata Kuetz. Deep pool near Canal, near Cairnbaan; Crinan Canal, near Lochgilphead.

**Eupatorium cannabinum* L. Tayvallich.

**Gnaphalium sylvaticum* L. About Ardrishaig.

**Lobelia Dortmanna* L. Loch Errol; Lochan Dobhrain.

Samolus Valerandi L. By shore near Achahoish.

**Gentiana baltica* Murb. About Cairnbaan; roadside between Loch Errol and Achahoish; shore, Tayvallich.

Euphrasia brevipila* Burn. & Gremli. By Crinan Canal, Auchindarroch; shore south of Ardrishaig.—E. gracilis* Fries. Tayhallich. — **E. scotica* Wettst. Hills behind Ardrishaig. These *fide* F. Townsend.

**Utricularia minor* L. and *U. intermedia* Hayne. Small loch on hills behind Ardrishaig; Lochan Dobhrain. *Fide* E. F. Linton.

Polygonum aviculare L. var. *agrestinum* (Jord.). By Loch Killisport, near Achahoish.

**Potamogeton alpinus* Balb. and **P. heterophyllus* Schreb. Crinan Canal, near Lochgilphead.

**Rynchospora alba* Vahl. Near Loch Errol.

Carex dioica L. Near Loch Errol.—**C. Œderi* Ehrh. Roadside near Loch Errol.—*C. rostrata* Stokes. Hills behind Ardrishaig.

***Isoetes lacustris* L. Loch Errol.

**Chara fragilis* Desv. Stream on hills above Ardrishaig; Loch Errol and stream running from same.—Var. *delicatula* Braun. Lochan Dobhrain. — Approaching var. *barbata* Gant. Lochan Taynish; Tayvallich. Messrs. H. and J. Groves kindly named these.

I also add a few notes on plants seen near Ardrishaig (chiefly) but on the vice-co. 98 (Argyll) side of the Crinan Canal.

†*Sagina nodosa* Fenzl. Roadside between Loch Gair and Lochgilphead.

†*Hypericum dubium* Leers. By Canal, Ardrishaig; bank near Kilmichael, Glassary.

†*Geranium pratense* L. Port Aun.

Rubus suberectus Anders. By Crinan Canal, near Auchindarroch.—**R. rhamnifolius*, form. Near Port Aun; Lochgilphead. The same remarks that Mr. Rogers made upon the Cairnbaan (Cantire) plant above also apply to the bramble gathered here.—*R. dumnoniensis* Bab. Cairnbaan.—*R. villicaulis* Koehl. var. *Selmeri* (Lindeb.). Near Port Aun; near Lochgilphead. The Rev. W. Moyle Rogers thought this rightly named, "though unusually weak."—*R. mucronatus* Blox. Roadside between Colintraive and Loch Riddon. A small neat-leaved form, which the Rev. E. S. Marshall has collected in several N. Scotland counties.

†*Potentilla palustris* Scop. By Crinan Canal, Ardrishaig.

†*Carum verticillatum* Koch. Roadside between Loch Gair and Lochgilphead, and shore between Port Aun and Loch Gair.

†*Œnanthe Lachenalii* C. Gmel. Port Aun.

Achillea Millefolium L. A beautiful, very brilliant, red-flowered form was common at Kilmichael.

Gentiana baltica Murb. Near Loch Riddon; shore near Kames; near Loch Gair.

Mimulus luteus L. Well naturalized by a stream at Kilmichael.

Euphrasia brevipila Burn. & Gremli. Near Loch Riddon.* — *E. scotica* Wettst. Roadside near Port Ann. Both *fide* F. Townsend.

Rynchospora alba Vahl. Near Kames; near Loch Gair.

Chara fragilis Desv., approaching var. *delicata* Braun. Stream between Kilmichael and Ford. *Fide* H. & J. Groves.

The plans marked † in above list are recorded in Watson's Top. Bot. without personal authority.

NEW AND RARE SCOTTISH HEPATICÆ.

By W. H. Pearson.

Mr. Symers M. Macvicar has recently made the most important additions to the list of Scottish Hepaticæ of recent years, full particulars of which will be given in his forthcoming List of West Inverness Hepaticæ; meanwhile the following notes record the most remarkable of his discoveries:—

Frullania fragilifolia Tayl. New to West Inverness.

F. germana Tayl. Confirming it as a Scottish plant.

Lejeunea calyptrifolia Hook. New to Scotland.

L. hamatifolia Hook. New to West Inverness.

L. ovata Tayl. New to West Inverness.

L. microscopica Tayl. New to Scotland.

Radula Carringtonii Jack. New to Scotland; hitherto only found in the South of Ireland.

Porella lævigata Schrad. New to West Inverness.

Lepidozia Pearsoni Spruce. First time recorded for Scotland; I have specimens, however, collected by the late Dr. Carrington near Loch Maree, and by Mr. James McAndrew, New Galloway, but these records have not been published before.

Adelanthus decipiens Hook. New to Scotland.

Harpanthus scutatus W. & M. New to West Inverness.

Mastigophora Woodsii Hook. New to West Inverness.

Scapania nimbosa Tayl. New to Scotland. This is one of the most important discoveries Mr. Macvicar has made, the plant having only previously been collected in one station in the South of Ireland, and only a little of this beautiful species is in herbaria.

S. planifolia Hook. New to West Inverness.

S. rosacea Corda, var. New to West Inverness.

Diplophyllum Dicksoni Hook. New to West Inverness.

D. taxifolium Wahlenb. New to West Inverness.

Plagiochila tridenticulata Tayl. New to West Inverness.

Jamesoniella Carringtoni Balf. New to West Inverness.

Jungermania Orcadensia Hook. New to West Inverness.

J. Bantriensis Hook. var. *Muelleri*. New to West Inverness.

Metzgeria hamata Lindb. New to Scotland.

M. conjugata Lindb. New to West Inverness.

CRITICAL NOTES ON SOME SPECIES OF *CERASTIUM*.

By Frederic N. Williams, F.L.S.

A monograph of the genus *Cerastium* was published by Charles Grenier in 1841. In this interesting example of Grenier's systematic work, which consists of ninety-five pages, with nine plates in which fourteen species are figured, forty-eight species are described. The critical acumen which he showed in gauging the relative importance of specific characters is exemplified in his treatment of the genus; and in a decade in which George Bentham and Jacques Gay represented divergent schools of systematic botanists the mild protest which, in the preface to his work, he addressed to those who encouraged the unnecessary multiplication of species is much to the point, and will well bear repeating at the present time, which has seen the completion of a lithographed presentment of the Flora of Europe elaborated in twenty-seven volumes with the slenderest padding of descriptive detail. Translated, it reads thus:—"According as the bias of synthesis or analysis predominates in the minds of those who are concerned in the study of the fixation of species, you will find their number diminish or increase with the examination of material. From this proceeds two schools, of which one seems to be bent on the multiplication of species, whilst the other, urged by the contrary tendency, seeks to restrict the number. In observing what goes on around us among certain species of animals and plants, in reflecting on the numerous modifications which domestication, climate, the action of the sun, etc., have on species; I have considered that it would be better to err by excess of reduction than of multiplication, persuaded, moreover, that in doing so, one would burden science less, and that there would never fail men who have an opposite tendency to mine. I have always tried to distinguish carefully the forms known to me; and if in this memoir of mine they are not described as species, they will be found under varieties, so that others, if they have sufficient reason, may raise them to the rank of species."

It will be some considerable time before the materials for a revision of the species of *Cerastium* can be digested and codified; and meanwhile I offer a few notes on some of the published species, taking the names in strictly alphabetical order, and in collation with the list given in Mr. B. D. Jackson's *Index Kewensis*. As Mr. J. G. Baker implied in his review of Richter's *Plantæ Europeæ*, the difficulty in the grouping of forms lies not so much in the examination and comparison of available material in the shape of specimens, as in the unconscionable amount of overlapping in the more or less detailed descriptions of subordinate forms under specific names associated with the ever more involved and intricate tangle of synonyms; which makes neither for lucidity of sequence, nor for the adequate expression of deviations from the type within the limits of the genus, by the aid of a linear and dichotomous arrangement. In other words, the more completely the comparison of specimens is lixiviated from the bibliography of the species, the simpler will be the treatment of the genus.

1. CERASTIUM ACHERONTIUM Téglás, Real. Tudositvanyaib. i. 17 (1872) = *C. triviale* Link. Omitted from the *Index Kewensis*, as the diagnosis is in Hungarian.

2. C. ACUTIFOLIUM Dufour, Lettr. Mont. Maudit. 371 = *C. alpinum* L. Mentioned neither by Tanfani in Parl. Fl. Ital. ix. (1892), nor by Rouy & Foucaud, Fl. de France, iii. (1896). Type-specimens are not known.

3. C. ACUTIFOLIUM Schur, Enum. pl. Transsilv. 122 (1866). In the *Index Kewensis* reduced to *C. ovatum*. This species, however, does not occur in Transylvania; and the specimens referred to *C. ovatum* by Schur belong to a very different species, *C. trigynum*. Simonkai refers *C. acutifolium* to *C. alpinum*, but Schur's description of the bracts is very precise: he says, "bracteis naviculatis obtusis scariosis, margine ciliatis." Now in all forms of *C. alpinum* the bracts are herbaceous or only very narrowly scarious at the margin, and acute or acuminate. I would rather refer the plant to *C. lanigerum* Clem., of which it may be considered a variety (*C. lanigerum* var. *acutifolium*), This last is a species which is found in Bosnia, Herzegovina, Küstenland, and also in Thessaly, and includes connecting forms varying in the density of the indumentum, from the light villous hairs found in the Transylvanian plant to the dense woolly covering of *C. lanigerum* var. *alpicolum* Hausskn. (in Mittheil. Thüring. Bot. Ver. 1893, 55).

4. C. ADHÆRENS Fisch. in herb. DC., ex Gren. Monogr. Cerast. 70. These are Hungarian specimens of *C. arvense*.

5. C. ADSCENDENS Wender. ex Steud. Nomencl. Bot. ed. 2, i. 328 (1840). One of the names taken up by Steudel. I can find nothing about the plant, and it is not mentioned in any German flora. Whether type-specimens are among the 'Pl. Carinthiaceæ' in DeCandolle's herbarium at Geneva I do not know.

6. C. AFRICANUM Oliver, Fl. Trop. Afr. i. 141 (1868).

Var. RUWENZORIENSIS Williams. Folia utrinque pilis longe hirsutis vestita, acuminata (*G. F. S. Elliot*, 1893–94, nn. 7569 b, 7670).

Hab. British East Africa: Mt. Ruwenzori, in Uganda.

Var. KILIMANJARENSIS Williams. Folia minora quam in typo, anguste lineari-lanceolata acuta, minus remota. Petala calyce sesquilongiora (*Volkens*, 1893, n. 792).

Hab. German East Africa: Mt. Kilima-njaro.

Both these varieties are distinguishable in aspect, rather than by technical characters. The species has a wide range in Africa, and its geographical limits are here given, as verified from specimens examined:—N. and W. German West Africa; Cameroons Mountains, 2000–3000 metres (*Mann*, ex *Oliver*, Fl. Trop. Afr. i.). E. German East Africa; Mt. Kilima-njaro (*H. H. Johnston*, 1884), and Usambara district (*Holst*, 1893, n. 3254). S. Natal; Drakensberg Mountains (*Cooper*, 1873).

First described as an *Arenaria* by Hooker from Mann's specimens. In these type-specimens the capsular teeth are distinctly circinato-convolute, an important character which is neither noted by Hooker nor mentioned by Oliver, nor is any clue given as to whether the plant is annual or perennial. The species is thus readily referred to the subgenus *Strephodon*, and is placed in the group which includes *C. perfoliatum* L. Another African species closely allied to it is *C. Madagascariense* Pax, from which it is distinguished by its glandular surface, quite sessile leaves, and generally retuse petals. In Hildebrandt's specimens of the Madagascar species, as well as in those of Forsyth Major, collected in 1895, the similar character of the capsular teeth is well marked. The Natal specimens satisfactorily match those found further north.

7. C. AGGREGATUM Dur. herb. et in litt. 1839, ap. F. W. Schultz in *Flora*, 1840, 123, etiam in Pl. Gall. Germ. exs. cent. iii. no. 40 = *C. densiflorum* Guss. While *C. aggregatum* is the name taken up by Willkomm & Lange (Prodr. fl. Hisp. iii. 634), *C. siculum* Guss. is that taken up by Tanfani (Fl. Italiana, ix. 484). I prefer to these *C. densiflorum* (1832), a plant described on the preceding page of Gussone's work, certainly conspecific with *C. siculum*, and a much more expressive name, according with that selected by Durieu for his plant. Moreover, the form in which the flowers are disposed in a contracted cyme (or rather dichasium) has a far wider range.

8. C. ALBUM Presl, Fl. Sicula, 167 (1826). Syn. *C. Columnæ* Tenore, Prodr. fl. Napol. i. 27 (1811), et Fl. Napol. iv. 235 (1830). *C. tomentosum* var. *Columnæ* Tenore, Syll. Pl. Neap. 221 (1831). In his description Presl says it is near *C. tomentosum*, "sed tomento albo denso, sepalis capsulaque differt capsula calyce dimidio longior, sepala ovata." This form seems to match *C. tomentosum* var. *niveum* Ledeb. Fl. Rossica, i. 414: "herba tomento crasso adpresso niveo."

9. C. ALPESTRE Schur, in Verh. Naturf. Ver. Brünn, xv. ii. 151 (1877) = *C. triviale* Link. Subalpine specimens not distinguishable from the type.

10. C. ALPIGENUM Schur, in Verh. Naturf. Ver. Brünn, xv. ii. 149 (1877) = *C. alpinum* var. *lanatum* Lamk. (sp.) Encycl. Meth. i. 680. The specimens so named by Schur in Csato's herbarium were from Pareng, in Transylvania. Similar specimens were subsequently referred by Schur (Phytogr. 149) to *C. triviale* var. *saxigenum*. They certainly do not belong to this species, but to *C. alpinum*. The specimens collected in 1876 were referred by Adolf Oborny to *C. triviale;* and to this species the plant is reduced in the *Index Kewensis.*

11. C. ALPINUM L. Sp. Plant. 438 (1753); Fl. Suecica, ed. 2, n. 418 (1755); Reichb. Ic. Fl. Germ. Helv. 4977. A species of wide distribution in the arctic and north temperate zones. In Europe, under polymorphous forms, it occurs at considerable elevations on alpine pastures, where the soil is of a granitic or gravelly character; and is generally distributed in such localities on the continent, except perhaps in Greece, Crete, and Sicily. There is no doubt that forms are frequently referred without much discrimination indifferently to *C. arvense*, *C. latifolium*, and *C. Carinthiacum;* and hence much confusion has arisen in regard to the correct distribution of these species. In Scotland it ascends to 1190 metres in Perthshire, in Spain it reaches 3150 metres on the Sierra Nevada. In N. Asia the species is found in north and east

Siberia and in Japan. Beyond the Arctic Circle it is recorded from Spitzbergen, Bear Island, Greenland, Novaya Zemlya, Melville Island, North Alaska, and the land of the Tschuktchees in N.E. Siberia. Specimens were long ago collected in Spitzbergen, and were sent to Linnæus by his friend and correspondent Rolander Martin. An interesting series of specimens, both of the type and of aberrant forms, has recently been collected by Colonel Feilden, during a visit to Novaya Zemlya and Vaigatch Island. In North America the species extends from Alaska and Labrador southward to Arizona and California.

12. C. ALSINIFOLIUM Tausch, in Syll. Ratisb. ii. 243 (1828). Not mentioned by Grenier in his monograph of the genus. By Kitaibel referred to *C. ovatum*, by Bohemian botanists to *C. arvense*, and according to Nyman authentic specimens in Schur's herbarium belong to *C. alpinum* var. *glabratum* Wahlenb. The type-specimens, of which I have no precise information, are in the Prague Herbarium.

13. C. ALSINOIDES Lois. in Pers. Syn. Plant. i. 521; et Fl. Gall. i. 271 (1806); Guss. Fl. Sic. Prodr. suppl. 140. [= *C. tetrandrum* var. *alsinoides* Rouy & Fouc. Fl. de France, iii. 217 (1896).] The type-specimens so named by Loiseleur-Deslongchamps in Clarion's herbarium were collected in the dept. of Gironde, near Bordeaux. Mr. Frederick Townsend pointed out (Journ. Bot. 1877, 34) that this plant is not specifically distinct from *C. tetrandrum*, and at best can only be considered as a variety, and further showed that Grenier's description of *C. pumilum* in his supplement to the Fl. de la Chaîne Jurassique" (1869) in part fits both *C. pumilum* and *C. tetrandrum*, but more particularly the latter. This plant from the neighbourhood of Bordeaux is distinguishable by its "broad and entirely herbaceous bracts, by its much divaricated stems and panicle, and above all by its flowers, many of which are tetramerous." After carefully considering their claims, I would write up the synonyms of this variety of *C. tetrandrum* as follows:—

C. semidecandrum (non L.) Pers. Syn. Plant. i. 521.
C. pumilum "Auct. gall. plur." var. *α genuinum*, et var. *δ intermedium*.
C. glutinosum var. *bracteatum* Westerl. in Bot. Notis. 1869, 145.
C. pumilum Gren. & Godr.; Willk. & Lge. (fere in toto); var. *laxum*, var. *divaricatum*.
C. gracile Dufour, in Ann. Gén. Sc. Phys. vii. 304 (1820).
C. pentandrum (non L.) Moris, Fl. Sardoa, i. 265.
C. subtetrandrum Murbeck *ap.* Baenitz, Herb. Europ. anno 1892.

This would give its geographical distribution N. and E. of Spain, S. of France, Corsica, and Sardinia. By way of emphasizing its diagnosis from other forms of *C. tetrandrum*, a brief Latin description will suffice:

C. tetrandrum var. *alsinoides*.—Planta 11–13 centim. alta, præ caulibus paniculaque irregulariter dichotoma; bracteæ latæ foliaceæ omnino herbaceæ basi ad apicem pilosæ, ovales vel suborbiculares, acutæ; pedicelli inferiores calyce 1–3-plo longiores; flores plerumque pentameri, interdum nonnulli tetrameri.

(To be continued.)

WAYFARING NOTES IN RHODESIA.

By R. Frank Rand, M.D., F.L.S.

(Continued from p. 145.)

The last notes were made in December, 1897, these in May, 1898. In this country December has the bloom and vigour of youth; it is May that is sere. It is winter, but, in spite of that, at midday the sun is hot and the glare fierce. There is a cold bite in the wind through all, and at sundown the temperature falls, to reach its lowest before dawn. It is exceptional to have a calm day. Of wintry aspect, such as we associate with the home winter, there is little. Some of the trees, but these are few, have entirely shed their leaves; others partially. One sees many trees shedding a profusion of dead leaves, and still carrying many that are autumn-tinted or green. Others are in full green leaf. But in the case of the herbaceous plants it is winter indeed. With few exceptions these have bloomed, seeded, and gone, with scarce a twig of them remaining. The grasses have seeded, and the winds have spread their seed broadcast, as one finds to bitter cost, for most of them are barbed, and penetrate clothing and skin to the confusion of all personal comfort until released. The grass, leaf and stalk, is dry and fawn-coloured. It is ripe for the first grass fire that may come along, and these fires have already commenced (end of May). The first fire often rushes through, leaving the larger stalks, which may still retain some succulence, merely charred; but these are consumed in later fires, for the same area is often burned over several times in a dry season.

There is little but the dry bones of a season's dead vegetation for the fires to feed upon, so that the havoc wrought is not so great as one might be disposed to expect. That these fires have in the past greatly modified the flora of Africa I think there can be but little doubt, for certainly no herbaceous thing could face them and live. They occasionally kill trees. Bush and shrub escape largely from the fact that the grass lying among them is mostly of sparse growth, so that its burning does them little damage; further, they are, many of them, at this time in green leaf, and not readily inflammable.

In places one sees patches of ground, sometimes many acres in extent, covered with a low turf-like grass, but the grass of the country generally is the strong, coarse, tropical growth which springs in tufts, leaving a bare area of a few inches or so around each tuft. When mature it has much the height of ripe wheat. In some moist localities its growth is so rank and high that one can only see over the top of it from horseback.

Among the few herbaceous things that survive, *Pretrea* is remarkable. It is, of course, well known, but some note of it as seen amid its natural surroundings may be of interest. It was flowering in December, and here and there the last flowers of its indefinite inflorescence may still be seen. The proximal axils of the straggling procumbent branches are in fruit. The fruit I first saw in the dried state; it was courteously shown to me by Prof. Macowan, the botanist to the Cape Government. The flower has a pretty pink tint, recalling that of *Erica Tetralix.* The leaves, prettily cut, have a suggestion of sage-green in their tint, most marked in the younger leaves. The plant delights in a thin sandy soil where other growth is scanty, smiles—if the licence of smiling be permitted in these pages—and is a villain; for all the cruelty of its fruit can only be guessed at. Its dread cousin, *Harpagophytum*, which I have only found, so far, in the neighbourhood of the Shashi river, is frankly horrible. *Pretrea* is more insidious. Each lateral shoot as it trails from one to several feet over the ground may carry up to a dozen or more separate fruits. The general outline of these capsular fruits is oval. Undried they average $\frac{3}{4}$ in. in length by $\frac{3}{8}$ in. in width. They have much the aspect and contour of some grotesque beetle. The surface to which the stalk is attached is flattened, and lies next to the ground. It is slightly convex, allowing the fruit to work a shallow firm bed for itself in the loose sandy soil. The upper surface of the fruit, distal as regards the point of attachment of the stalk, arches up over the seed chambers, forming a broad firm base for two powerful spikes. These spikes, very sharp and slightly incurved at the ends towards each other, pincer-wise, point directly upwards, and are the weapons which make *Pretrea* so formidable to any unprotected foot. The inward curve gives them sure grip upon any part they puncture. The average length of the free portion of the spike is, in the fresh specimens, rather more than a quarter of an inch. The plant does not care to be trampled, and favours open sandy tracts where its spikes do not run the risk of being muffled by neighbouring overgrowth. I found it upon one occasion abundant around the holes of jackals, so that possibly the burden and pain of carriage is occasionally laid upon them. The fruit necessarily finds its way into any body, less resistant than itself, that is pressed against it; that body must usually be an animal foot. What animal, is, to *Pretrea*, matter of indifference. Had *Pretrea* been a native of Europe, it would long ago have found its way into proverb and song.

Blepharis, which was flowering in December, is so still, an ornament in stony places. Also a second species, only now observed in flower, more spiny than the first, in ground which is marshy during the rainy season. A few Crassulas survive in weather-worn fashion, and in the sandy beds of the rivers and streams a few herbaceous things still linger.

The trees and shrubs furnish a more hopeful field to the collector. Many of the trees are in fruit. Noteworthy are several species of *Acacia*, their pods showing great diversities of size and form; quite a number of different species of *Combretum;* an arborescent *Bauhinia*, the pods averaging 8 in. in length by 2 in. in breadth; two species of *Ficus;* several species of *Rhus; Zizyphus;* and sundry others which I am sending to the British Museum for determination. Thorns are everywhere; one has to be perpetually on guard against them.

Some shrubby things are in flower. Around a *Celastrus*, a near ally, which was loaded with a small greenish-white blossom, many flies, apparently of the ordinary house-fly type, were swarming. A white *Plumbago* was found; it is not so pretty as the ordinary blue species so common in the Cape Colony.

There are many species of *Euphorbia*, showing great range in point of size. Among the succulent, fleshy ones, the large, shafted, candelabrum-like one is now in fruit. The trees are very conspicuous, as one of them often tops some rocky knoll, its shafts standing out clearly against the sky. One of different form and intermediate size has bright rose-coloured bracts; this I found growing hard by the site of Lobengula's old kraal, now Government House. At the other extreme is a groundling very abundant in stony places around Bulawayo. Its tough fleshy stems are four-angled and notched; the apices of each projection bear four spines, one pair ½ in. in length, the other pair quite short. The flower is bright green in colour, and about ¼ in. in diameter. It is very hardy, and when wounded or broken, which often happens hereabouts, a cap of congealed latex quickly heals up the exposed surface.

Inhabiting the same type of ground as this *Euphorbia* was an Asclepiad in rarity. If mimicry there be among plants, this may be an instance of it. The Asclepiad is fleshy, and the habit and size much that of the *Euphorbia*. Its angles are usually four, but occasionally there are six. It is notched, and although the projections appear to be formidable, they are not so, but fleshy, and only slightly resistant at the tips. The juice is abundant and watery.

Two species of *Loranthus* were noticed in flower, and a leafless *Viscum*. They mostly choose the Acacias as hosts. Possibly the protection afforded by the spines of the *Acacia* may determine this. I have seen *Loranthus* upon *Zizyphus* also; and, among spineless plants, upon *Rhus* and *Combretum*. A *Protea*, of shrubby habit, is in full white flower.

Fruit winged for dispersion by the wind, and at the same time very attractive and conspicuous in colouring, is seen in *Pterolobium laceram* Br. It grows in clusters by the side of streams, and is cruelly hook-thorned. The terminal branchlets are devoted to fruit, and seen *en masse* the effect of the dull red, silky, and winged legumes as they glitter and flutter before sun and wind is very striking and beautiful. The winged fruit of a low-growing, dwarf *Combretum*, which is very common the whole country over, is conspicuous from its brilliant red colour later in the year. Here and there one sees some shrub carrying its fruit upon branches and twigs entirely destitute of leaves, with rather weird effect.

One of the fruits sent—that of a *Gymnosporia*—is interesting. It loses much of its character in drying. It was growing upon a loose shrub bereft of leaves. The ripe fruit is reddish yellow in colour, and rather smaller than an ordinary marble. The fleshy, outer part easily splits into two nearly equal parts, and, falling off, discloses the dark brown seed held by a fleshy cherry-red arillus, as in a bird's claw. There are four processes to the arillus, and they do not quite reach the apex of the seed. The seed itself is hard as a date-stone, of isoseles triangular section in horizontal plane, the odd side being the longest. In surface view one side may be regarded as flat, the other as strongly keeled. One process of the arillus lies along the keel, one along either angle (the basal angles as seen in section), and the fourth lies appressed to the flat side; *i. e.* the long side as seen in section. A few of these shrubs in the patch were adventuring tufts of tender green leaves, not yet outspread—a promise of spring.

TWO BERKSHIRE VARIETIES.

By G. Claridge Druce, F.L.S.

On p. 222 I published a note on *Helleborus occidentalis*, which Mr. Britten, in his review of my *Flora of Berkshire*, considered I had included on insufficient evidence. I desire now to notice the two other instances which he specified.

Iberis amara L. var. ruficaulis (Lej.).

With regard to this, I followed the Kew *Index*, Koch's *Synopsis Floræ Germanicæ*, and De Candolle's *Systema* in treating Lejeune's plant as a species. Not having seen Lejeune's *Flore de Spa*, I borrowed the description in Koch's *Synopsis* (p. 70, 1837), which runs thus:—"b. minor, foliis angustioribus, calyce violaceo et petalis in violaceum vergentibus, et caule purpurascente. *I. ruficaulis*, Lejeune, Fl. Spa, ii. p. 58. *I. amara*, b. [Lejeune & Courtois] Comp. Fl. Belg. ii. p. 311. Inter plantam vulgarem occurrit." Mr. Britten noticed that I made no allusion to the clothing of the stem in connection with the word *ruficaulis;* neither do Koch, or Rouy and Foucaud, perhaps for the reason which influenced myself, *viz.* that the hairiness of the stem in *Iberis amara* appears to be very variable and inconstant, as is the colour of the flowers. My notice of the characters of *ruficaulis*, "smaller size and purplish flowers," intentionally brief, seems to have misled Mr. Britten to think that I was alluding to the ordinary purple-flowered form of *I. amara*, which grows frequently with, and gradually merges into, the type, but is not necessarily of smaller size or identical with *ruficaulis*, nor did I dream of naming it as a variety. It is already made a var. under the name *violacea* by De la Croix, and a specimen contributed by A. Déséglise from Berry in 1862 is to be seen in the Herbarium of the Jardin des Plantes at Paris. I inserted var. *ruficaulis* in my *Flora of Berkshire* on the ground of the agreement of my plant with Koch's description, and after comparison with a continental specimen; I have since submitted my plant from Lowbury to M. Rouy, and he considers my determination to be correct. I may observe that I have the same plant from Watlington, in Oxfordshire.

Rouy and Foucaud (vol. ii. pp. 135–140) make *I. ruficaulis* Lej. one of eight forms of *I. amara* L., and synonymous with *I. decipiens* of Jordan's *Diagnoses*, using the word form in a different sense to us, namely, to designate a state of the plant superior to a variety. (See the preface to *Flore de France*.)

MALVA MOSCHATA L. var. RAMONDIANA Gren. et Godr.

As regards the above variety, I have to say that in my account of *M. moschata* I followed Grenier and Godron in their *Flore de France*, who give three varieties—*laciniata*, with "toutes les feuilles divisées en lanières étroites," the common plant in Berkshire, often cultivated in the white-flowered form (I am told by a friend that out of two thousand plants which he may have in cultivation in a year, not one will show an undivided leaf); *intermedia* Gren. et Godr., with "feuilles caulinaires divisées en lanières étroites, les radicales reniforme crenelées," rarer in Berkshire, but seen by myself in several localities; *Ramondiana* Gren. et Godr., with "feuilles toutes entières dentées," which I have only seen near Tilehurst. Some of the Tilehurst plants had all the leaves undivided (that is, typical *Ramondiana*), but the greater number had the upper leaf or the upper leaves lobed, but not cut into segments; in fact, the leaves, as we should expect, varied as leaves will vary. But, as I have said, I have specimens from the locality which agree with the description of *Ramondiana*, and M. Rouy, to whom I sent one, accepts my determination. I also contend that it is better to refer to *Ramondiana* plants which differ only slightly from it than to put them to *intermedia*, from which they are much more widely separated; nor did I think it desirable to give a new name to designate a varying series of forms. The above statement, to my mind, meets the reviewer's objection, "That the plant I have called *Ramondiana* does not agree with the description of the type." Mr. Baker's remark in full was: "A very interesting variety of *moschata*. This certainly must closely approach var. *Ramondiana*, but I only know this from the description. . . . The upper leaves are certainly lobed." To this variety may also belong a plant referred to in Woods' *Tourist Flora*, p. 62, in the following words: "Mr. Borrer gathered in Somersetshire a variety of *M. moschata* which had the stem-leaves as well as the radical leaves cordate-subrotund. It has propagated itself in his garden for twenty years without alteration." Woods' description of *M. moschata* would lead us to infer that the plant he describes as the type is the var. *intermedia*, as the root-leaves are said to be cordate-subrotund. It is interesting to find that such "slight and variable characters" as those shown in the cutting of the leaf may remain constant during many years of cultivation. The names *heterophylla* and *integrifolia* given to the vars. of *M. moschata* by Lejeune and Courtois in the *Compendium Floræ Belgicæ*, vol. iii. p. 14 (1836), and adopted by MM. Rouy and Foucaud, are prior to the names *intermedia* and *Ramondiana* of Grenier and Godron, which only date from 1848. MM. Lejeune and Courtois describe their *integrifolia* as having "folia omnia rotundata inciso-lobata." MM. Rouy and Foucaud put var. *Ramondiana* as synonymous with *integrifolia;* and their diagnosis allows a much greater range of variation than I have assigned to the plant I have called var. *Ramondiana*. Their description is as follows:—"Feuilles toutes, à l'exception des ultimes, à limbe orbiculaire subcordé, denté ou lobulé, les ultimes trifides ou tripartites à lobes inégalement dentés."

There is no specimen of Grenier and Godron's *Ramondiana* in Paris, but a plant with two or three of the upper leaves not only lobed, but cut into segments, coming, I believe, from Normandy (where it is said to be very rare), and labelled with the query, "Is this your *Ramondiana?*" is preserved among Dr. Grenier's plants. If I had known of the earlier names given by Lejeune and Courtois when I wrote my *Flora*, I should have adopted them; but I think I have shown that I have sufficient evidence for the inclusion of the var. *Ramondiana* (*integrifolia*) among our Berkshire plants.

[With regard to the foregoing, I would say that the fact of other writers having misquoted Lejeune does not justify Mr. Druce in doing so, or in continuing as above to place Lejeune's name in brackets when quoting him as an authority for his variety. I made no reference to the "clothing of the stem," but Lejeune's definition is "Diffère de l'espèce principale par ses feuilles ciliées, plus étroites, par sa tige velue, et comme chargée d'un tomentum roux, et par son port plus petit": Rouy & Foucaud say, "tige plus ou moins rougeâtre, rameaux rougeâtres." Mr. Druce inserted the plant in his Flora because he thought it agreed with Koch's description, and "after comparison with a continental specimen"—named we are not told by whom, but clearly not authentic.

As to *Malva moschata* var. *Ramondiana*, I confess myself unable to understand clearly what Mr. Druce means, nor does he make matters simpler by omitting from "Mr. Baker's remark in full" words (already printed by me) which complete its sense. Here is the sentence —the words omitted by Mr. Druce are placed in brackets:—"I only know this from the description [which is 'feuilles *toutes* entières, dentées']. The upper leaves [here] are certainly lobed." Mr. Druce has seen no type, but seems to lay stress on a plant sent to Grenier wlth a note—"Is this your *Ramondiana?*" I fail to see what connection this can have with the point at issue.

M. Rouy's confirmation of Mr. Druce's naming, however valuable, cannot affect the publication of these forms in the *Flora of Berkshire*, as it was not received until after my criticism appeared. I am therefore still of opinion that both plants were included "on evidence which cannot be considered as sufficient," even if the naming should hereafter prove to have been correct.

I print Mr. Druce's note in full because he has charged me with having treated him unjustly, and I am therefore anxious to give him every opportunity of stating his case. Had it not been for this, I should in the interests of my readers have declined to print communications which scarcely add to our knowledge and hardly touch the ground of my criticism. I do not, however, propose to publish a further note of similar character which Mr. Druce has sent me.

I may take this opportunity of saying that in his *Flora of Berkshire* Mr. Druce seems to attribute to me more responsibility for my little *Contributions* to the flora of the county than I am disposed to accept. There are no doubt mistakes in it for which I am to blame, but he seems to have overlooked my prefatory caution that, except where a mark of certainty was attached, "the names in the list stand simply on the authority of those who have recorded them." In one instance (Fl. Berks. p. 79) Mr. Druce says he "cannot reconcile" certain of my statements. His difficulty, as I could at once have told him had he asked me, is caused by his having understood "here" in the passage quoted as meaning Buckinghamshire, whereas it referred to the British Museum Herbarium, whence the note was written.—James Britten.]

SHORT NOTES.

Trifolium Molinerii in Dorset. — Early in June, Mr. H. W. Pugsley found growing near Poole a plant which he and I at once took to be this species. I forwarded a specimen to Mr. Arthur Bennett, who writes: "I think the specimen sent must go to *T. Molinerii*, though it is difficult to distinguish between white *incarnatum* and that plant." Mr. Pugsley informs me that there were not more than a dozen specimens of the plant, which was growing on a grassy bank by the road; but he hesitates to express an opinion as to its indigenity or otherwise. In Herb. Brit. Mus. there is a specimen labelled "Wareham, Dorset, May 1884, H. N. Ridley & W. Fawcett," which I consider identical with the plant found by Mr. Pugsley.—W. West, junr.

Plantago media in Antrim.—*Plantago media* was found by me growing at Benvarden, Dervock, in July last. This, I believe, is the first record for Co. Antrim. I have also found it at Ardhea, Co. Tyrone.—S. A. Brenan.

Arenaria serpyllifolia. — In the last edition of the *London Catalogue* the varieties of *Arenaria serpyllifolia* L. are given as b. *glutinosa* Koch, c. *leptoclados* (Guss.), d. *Lloydii* (Jordan). It appears that var. *viscidula* Roth, Enum. 2, p. 318 (1827), is an earlier name for b. *glutinosa* (confer Rouy & Foucaud, Fl. de France, iii. 240, where *A. sphærocarpa* Tenore is considered synonymous with it). The eglandular var. *Lloydii* (Jordan) occurs in all the counties bordering the Channel, there being specimens in the National Herbarium from Kent, Sussex, Hants, Isle of Wight, Dorset, Devon, and Cornwall. There are also specimens from Ireland, Co. Wexford, collected by Rev. E. S. Marshall. Mr. Williams, in his monograph (Journ. Linn. Soc. Bot. xxxiii. 367), retains *A. leptoclados* Guss. as specifically distinct from *A. serpyllifolia* L. The forms of this, *α scabra* Rouy & Foucaud and *β viscidula* Rouy & Foucaud, corresponding to the two similarly named forms of *A. serpyllifolia* L., should be looked for in this country. Mr. Williams does not mention *A. serpyllifolia* L. var. *stricta* Townsend

(Fl. Hampshire, 57), an eglandular plant having short pedicels, and thus approaching var. *Lloydii* (Jordan).—E. G. BAKER.

RUMEX ACETOSELLA L. var. ANGIOCARPUS.—Under this name Dr. Pospichal (Fl. Oesterr. Küstenl. i. 383 (1897)) refers to a plant which was described as a species by Dr. Murbeck in 1892. Pospichal's character for the form is "Fruchtklappen der Frucht angewachsen, Blüten winzig (1 mm.)." As, however, we find in the very wide distribution which Murbeck assigns to the plant "Irland: County Down, l. Ball," it may be well to transcribe the full description for the benefit of British botanists:—

RUMEX ANGIOCARPUS Murbeck, Beiträge Fl. Südbosn. & Hercegowina (in Acta Soc. Phys. Lund. xxvii. 1892, p. 46). "Radix perennis, perpendicularis, foliorum fasciculos caulisque erectos vel adscendentes, superne vel jam a basi ramosos, 1·5–4 dm. altos emittens. Rami erecti vel suberecti, stricti vel subflexuosi, superiores paniculam aphyllam constituentes. Folia rosularum sterilium caulinæque inferiora nunc hastato-lanceolata, lobis lateralibus triangularibus vel linearibus indivisis, nunc omnia vel nonnulla hastato-tripartita lanceolata, lacinia media oblongo-lanceolata apice obtusiuscula vel rotundato-obtusa, lateralibus palmato-2–5-fidis divaricatis; caulina superiora lanceolato-linearia, hastato-trifida vel integerrima. Folia omnia petiolata, glabra vel infima papillosa, glaucescentia vel cano-viridia. Verticillastri pauciflori, subdistances. Flores dioici, pedunculi demum reflexi, apice articulati. Perigonii phylla exteriora oblongo-lanceolata, erecta; interiora in floribus femineis fructiferis obsolete nervosa, ecallosa, achenio arcte connata eoque nec latiora nec longiora. Achenium acute triquetrum, quam in *R. Acetosella* plerumque paullo majus.—Fl. & fruct. Jun.–Aug."

GYMNADENIA CONOPSEA × ALBIDA IN SCOTLAND.—Late in June two or three specimens of an orchid were forwarded to me from the neighbourhood of Arisaig, West Inverness, which I thought, from description, might be *G. odoratissima* Rich., or perhaps the above hybrid. I suggested the former name to the sender as a possibility, but through a misinterpretation of my letter a note was unfortunately published in the *Gardeners' Chronicle* of July 23rd that the plant had been identified at Kew. This, however, was not the case, and on my subsequently taking the specimen to Kew, Mr. Rolfe kindly undertook its diagnosis, and pronounced it to be *G. conopsea* × *albida*; he has published a notice thereon in the *Orchid Review* for August, p. 238. The specimens were gathered by Mr. Dixon, who first noticed the plant, growing very sparingly in the company of its two parents, at about 100 ft. above sea-level. It should be looked for elsewhere, where the two species grow together. It has the general aspect of *G. conopsea*, but with a much shorter and stouter spur.—A. H. WOLLEY DOD.

[Mr. Rolfe's notice, after a paragraph conveying the above information, runs:—"These two species are very dissimilar. *G. albida* has white flowers, an equally tricuspidate lip, and a short, swollen and obtuse spur, not equalling the lip; while *G. conopsea* has rose-purple flowers, an unequally trilobed lip, and a filiform, acute spur many times longer than the lip. The hybrid—for such it evidently is—has rose-purple flowers, but the spur is stout, and only twice as long as the lip, which latter organ is about intermediate in shape; the leaves also are intermediate in shape; but the spike closely resembles that of *G. albida*. Such a hybrid has already been recorded by Hegelmaier in 1864, under the name of *Gymnadenia conopsea* × *albida* (*Œsterr. Bot. Zeitschr.*, 1864, pp. 102–104), and by Kerner, a year later, as *G.* × *Schweinfurthii* (*Verhandl. Zool.-Bot. Gesellsch. in Wien*, xv., p. 213, t. 5, fig. 15–16). It was found by Dr. Hegelmaier in July, 1863, in the Austrian Alps, and the Scotch plant is evidently substantially identical. The discovery is very interesting, and it seems probable that it might be found in other localities, where the two species occur intermixed, if searched for."]

Lathyrus Aphaca in Cambridgeshire. — In Mr. West's notes on Cambridgeshire plants (p. 246), it is stated that *Lathyrus Aphaca* has disappeared from its Cambridge localities. Through my friend the Rev. H. P. Reader, I possess a specimen of this plant collected at Hills Road, Cambridge, in July last, by Mr. A. H. Evans. It may of course be only a casual in this station.—A. B. Jackson.

An Insufficient Abbreviation.—I have more than once pointed out that when two contemporary botanists have almost precisely similar names, the only way of avoiding confusion is to write each name in full. Yet our American *confrères* persist in abbreviating the name of one of their most distinguished botanists in such a manner as to render it indistinguishable from that of one who—if priority is to govern this as it is supposed to do most other matters connected with nomenclature, and especially American nomenclature—may claim to have been first in the field, although he would not presume to enter into competition on any other ground.

A recent paper by Dr. Terraciano in the *Contribuzioni alla biologia vegetale* (vol. ii. fasc. 2, 1898) gives an excellent example of what is likely to happen if this course is persisted in. Dr. Terraciano cites in his text "*Ceiba boliviensis* Britt.," and adds in a footnote, "Britt. in Mem. Torrey botanical Club, vi. 1896, p. 11." No one could possibly suppose from these citations that two different botanists were indicated; but such is the case. *Ceiba boliviensis* was published in a joint paper by Mr. E. G. Baker and myself, printed in this Journal for 1896 (p. 174); but the paper quoted in Dr. Terraciano's footnote is by Dr. N. L. Britton.*

The saving of space effected by the omission of two letters is very small, and the resultant gain cannot compensate for the inconvenience which must arise (and has already arisen) from the employment of an abbreviation which applies equally to both names—an abbreviation which, moreover, breaks the only rule laid down by De Candolle on this head,* and is not countenanced by either of the botanists to whom it equally applies.—James Britten.

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* Although Dr. Britton cites the species as of "Britten," it should of course be quoted as of "Britten & Baker fil."

NOTICES OF BOOKS.

The Potamogetons (Pond Weeds) of the British Isles: with descriptions of all the species, varieties, and hybrids. By Alfred Fryer, A.L.S.; illustrated by Robert Morgan, F.L.S. London: L. Reeve & Co. Parts i.–iii. Price 15s. uncoloured, 21s. coloured (net). 4to, pp. 24, tt. 12.

We welcome the appearance of the first instalment of this important work, and we trust that it will progress steadily and rapidly towards completion. Undertakings of this kind have a tendency to linger, and the result is a want of unity between the parts of the work, and a consequent depreciation of its value as a whole. When it is finished, we may hope for a detailed review from one of the few botanists competent to deal with the genus; meanwhile our readers will expect to be told something about it.

It is unnecessary to speak of the qualifications either of author or illustrator for the task they have undertaken, especially in this Journal, to which so many communications upon *Potamogeton* have been contributed by Mr. Fryer with illustrations by Mr. Morgan. That some such monograph was urgently needed, every British botanist knows; and it is satisfactory to find that we have among us men capable of producing it. The only matter for regret is that such a work is necessarily expensive; it would be impossible to give adequate illustrations of the species in fewer or smaller plates. Perhaps when it is done Mr. Fryer will give us a brief synopsis of his work, which will serve both as an advertisement of the monograph and as a help to those who cannot afford it.

Mr. Fryer begins his work with a description of the genus, followed by a statement of his views as to species, and especially as to "hybrid species." As to synonymy, Mr. Fryer is cautious, but we gather that he does not in all cases intend to employ the earliest name, preferring to leave matters of nomenclature somewhat in abeyance until Mr. Arthur Bennett (whose generous help is gratefully acknowledged) "has published his complete nomenclature of the genus."

The present instalment contains descriptions and figures of *P. natans* L., × †*P. crassifolius* Fryer, × *P. fluitans* Roth, × *P. Kirkii* Syme, and *P. polygonifolius* Pourret, with numerous varieties; *P. coloratus* Hornem. is partly described. There are numerous synonyms and references, the abbreviations of which might have been better expressed; it is a matter of satisfaction to find that the communications of various botanists to our pages are so frequently quoted. We regret that Mr. Fryer has not given us a complete account of the distribution of each species in Britain, and we would venture to suggest that this should appear as an appendix. Such a list should correlate the various records in county floras, which at present represent very different views of species, and are not always in accordance with Mr. Fryer's conclusions. For example, Mr. Druce (Fl. Berks. 516) records *P. fluitans* without doubt as a Berkshire plant, and gives a long account of its collection; Mr. Fryer, however, says: "Mr. Druce sent me specimens from Berkshire, which probably will be found to belong to the *fluitans* group, but they are not sufficient to name with certainty"; and he does not include Berkshire among the counties producing it.

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* "Le seule règle sur ce point paraît être qu'une abreviation *doit se comprendre facilement.*"—*La Phytographie*, p. 272.

† The sign × is prefixed to what Mr. Fryer calls a "hybrid species."

A little more care should have been exercised in the reading of the proofs, especially as to proper names: "Sculley" and "T. F. Mott," for example, should be "Scully" and "F. T. Mott."

It is to be regretted that the publisher has not taken more pains to render his portion of the undertaking worthy of the work; unfortunately he has not done so. The plates, for instance, bear no names; "L. Reeve & Co. London." stands in every case where the näme ought to be. This is not only absurd, but extremely inconvenient for reference; every purchaser of the work will be compelled to supply for himself the publisher's omission, and this will, to some extent, disfigure the plates. The arrangement of the text is equally faulty. In a work of this importance, each species should of course begin on a fresh page; here, however, everything runs on—the first species begins in the middle of the page where the description of the genus is ended; the sixth within ten lines of the bottom of a page. Exception might be taken to other details of arrangement, but these are sufficient to show that the author may justly complain of the way in which his work is brought before the public. If Messrs. Lovell Reeve will refer to one of the parts of Mr. Hanbury's beautifully (but slowly) produced *Monograph of British Hieracia*, they will see how such a work ought to look.

We would suggest that the date of future numbers should at least be placed upon the wrapper, and we hope that, when the monograph is completed, an accurate record of the dates of publication will be placed on the back of the title.

Palmæ Mattogrossenses novæ vel minus cognitæ quas collegit descripsit et iconibus illustravit J. Barbosa Rodrigues. Rio de Janeiro: Leuzinger. 1898. 4to, pp. 92, tt. 27.

It is now nearly thirty years since Dr. Barbosa Rodrigues first entered the botanical ranks as a describer of the plants of his native country, and since then several meritorious memoirs have appeared from his pen, notably those on the Palms and the Orchids. Dr. Rodrigues has recently availed himself of the facilities now offered for reaching, by a pleasant journey of a few days from Buenos Ayres, the very centre of Matto Grosso, and the handsome memoir now under notice is the first fruit of his expedition. Dr. Rodrigues did not penetrate into the barely known country lying to the north of Cujabá; but though his explorations were restricted to the neighbourhood of the capital and to places like Corumbá and Melgaço on the way up, he succeeded in finding several palms new to science; species, too, which have never been collected before, unless possibly by Weddell, that "dark horse" of botanical explorers, whose nondescripts are still awaiting disinterment at Paris. It would savour of presumption were one who has made no special study of Palms to attempt a criticism in every way worthy of the subject of this essay; but I cannot refrain from the suggestion that the author is at times rather too much inclined to "lump" species. A flagrant instance of this is *Cocos Romanzoffiana* Cham., under which he includes no less than five other names, all maintained as of specific value by Prof. Drude in his fine monograph in the *Flora Brasiliensis.* I am myself affected by this description of the Brazilian savant, for he sinks my *Diplothemium jangadense* under *D. leucocalyx* of Drude, without showing any appreciation of the important floral differences between the two. Moreover, I do not quite like Dr. Rodrigues's idea of nomenclature. Thus he describes under the name *Astrocaryum arenarium* Barb. Rod. a palm concerning which he is in doubt whether it may not be the *A. Weddelli* of Drude, when he would have been better advised, I think, in not giving a name until the doubt was resolved. And why, in referring the well-known *Attalea speciosa* Mart. to *Orbignia*, does he add to synonymy by calling the plant *O. Martiana* Barb. Rod.? The author asserts of the Caranda Palm (*Copernicia cerifera* Mart.), "one may say, as it were, that all the region of the Chaco is exclusively occupied by it"; but this is very far indeed from being correct.

The memoir is well got up and lavishly illustrated. Dr. Rodrigues promises further contributions to the flora of Matto Grosso, and these will be looked for with much interest.

S. M.

De Genere Bunchosia. By Prof. F. Niedenzu. Brunsberg, 1898. 4to, pp. 17.*

As it is about fifty years since M. Adrien de Jussieu monographed *Malpighiaceæ*, it is quite time some of the genera of this interesting natural order were again revised. M. de Jussieu enumerated twenty-three species of *Bunchosia;* Prof. Niedenzu has thirty-two species, which he has carefully characterized and placed in their correct sequence; there are also nine species which are unknown to him save by name, making altogether forty-one species.

The Professor divides the genus into two subgenera, *Ciruela* and *Malacmæa*, founded principally on the size of the flowers. The most important subdivisions of these are based on the colour and shape of the connective and its relation to the loculi. Other divisions are founded on the petals, whether lacerate-dentate, glandular or eglandular, &c. It has been found necessary to make considerable alterations in the species enumerated in Grisebach's *Flora of the British West Indies*, as in several cases these were wrongly identified.

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* Prefixed to "Index Lectionum in Lyceo regio Hosiano Brunsbergensi per hiemem a die xv. Octobris 1898 usque ad diem xv. Martii 1899 instituendarum."

While frequently agreeing with the writer in the changes he proposes, there are one or two points as to which we are inclined to differ from Prof. Niedenzu, or which seem to call for further explanation. For example, *Bunchosia mollis* is described by Bentham (in Hooker's *London Journal of Botany*, vii. 127), and founded on Schomburgk's no. 742. It is represented by this number of Schomburgk's in the National Herbarium, and seems indubitably Mr. Bentham's plant; but Dr. Niedenzu quotes Schomburgk's no. 742 for the preceding species, *Bunchosia rhombifolia* Turcz., and for *B. mollis* Benth. he quotes no. 544. Further work seems desirable on some of the plants of this genus found in New Granada. Prof. Niedenzu places *B. retusa* Tr. & Pl. among his unknown species, and altogether omits *B. deflexa* Tr. & Pl.; but specimens of both exist in the National Herbarium, and the latter, as well as the former, was published in 1862 (Ann. Sci. Nat. ser. 4, xviii. 311). We are not clear where the monographer intends to place the New Granadan plants which Triana & Planchon (*l. c.*) refer to *B. nitida*. It ought not to be difficult to obtain information regarding the three "incognitæ" described by Sereno Watson in the *Proceedings* of the American Academy within the last three years. *B. cumanensis* Don stands in a different category; the name appeared in Loudon's Hort. Brit. ed. 2, p. 170, but no adequate description is given, and it is probable no type exists.

E. G. B.

ARTICLES IN JOURNALS.[*]

Bot. Centralblatt (Nos. 30–33).—F. Ludwig, 'Ueber Variationscurven.'—(Nos. 30, 31). G. Kükenthal, 'Aufzählung der von V. F. Brotherus im 1896 in Turkestan gesammelten Cyperaceen.'— E. H. L. Krause, 'Floristische Notizen' (concl.). — (Nos. 32, 33). P. Knuth, 'Zur Biologie der Bluten.'—M. Britzelmayr, 'Revision der diagnosen zu den von M. Britzelmayr aufgestellten Hymenomyceten-Arten.'—(No. 34). H. Barth, 'Studien über den Nachweiz von Alkaloiden in Drogen' (1 pl.).

Bot. Gazette (25 June). — R. Pound & F. E. Clements, 'Vegetation regions of Prairie Province.'— J. H. Schaffner, 'Nutation of *Helianthus annuus*.'—C. J. Peirce, 'Dissemination and reticulations of *Ramalina reticulata*.' — F. M. Lyon, 'Life-history of *Euphorbia corollata*' (3 pl.).—B. L. Robinson, Reasons against the Rochester Nomenclature.—Id., *Apios Priceana*, sp. n.—E. B. Copeland, 'Size of Evergreen Needles.' — C. D. Beadle, 'Botany of South-eastern States.' — (28 July). D. S. Johnson, 'Leaf and sporangia of *Pilularia*' (3 pl.).—F. de F. Heald, 'Germination of fern and moss spores' (1 pl.). — B. L. Robinson, '*Bartonia*.' — F. A. Waugh, 'Sundry American Plums.' — E. J. Hill, 'Two Noteworthy Oaks'

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[*] The dates assigned to the numbers are those which appear on their covers or title-pages, but it must not always be inferred that this is the actual date of publication.

(2 pl.).—(15 Aug.). B. Stoneman, 'The Development of some Anthracnoses' (12 pl.).—W. L. Bray, 'Flora of Lower Sonoran and Arid Zones.'

Bot. Zeitung (1 Aug.). — F. Oltmanns, 'Zur Entwickelungeschichte der Florideen' (4 tab.).

Bull. de l'Herb. Boissier (Aug.). — E. v. Halacsy, 'Die bisher bekannten *Centaurea*-Arten Griechenlands' (concl.).—H. de Boissieu, 'Les Légumineuses du Japon d'après la collections de M. l'Abbé Faure.' — L. Blanc & E. Decrock, 'Distribution géographique des Primulacées.'—A. Pestalozzi, 'Die Gattung *Boscia*' (cont.).

Bull. Soc. Bot. Belgique, xxxvii. fasc. 1 (13 Aug.). — F. Crépin, 'L'anatomie appliquée à la classification.' — A. Tonglet, 'Lichens de Dinant.'—Flore du Congo: M. Micheli, Leguminosæ (*Dewevrea*, gen. nov.); J. Briquet, Labiatæ; H. Hallier, Convolvulaceæ; F. Pax, Euphorbiaceæ; with additions to other orders.

Bull. Soc. Bot. France (xlv. pt. 2: July).—A. Chatin, 'La gradation organique considérée dans les organes de la nutrition et de la reproduction.' — P. Candargy, 'Flore de l'île de Lesbos' (cont.). —E. Bescherelle, 'Florule bryologique de Tahiti' (concl.).

Bull. Torrey Bot. Club (15 July).—A. C. Cook, 'Flora of Canary Islands.' — F. S. Earle & C. H. Peck, 'Alabama Fungi.' — A. Nelson, 'New Plants from Wyoming.' — J. H. Lovell, 'Insect-visitors of flowers.' — J. K. Small, 'Abnormal inflorescence in *Saxifraga fallax* (1 pl.). — E. G. Hill, '*Eleocharis melanocarpa* proliferous' (1 pl.). — (13 Aug.). A. W. Evans, 'Hepaticæ of Southern Patagonia' (4 pl.). — G. V. Nash, '*Eustachys* and *Chloris* in N. America.' — E. O. Wooton, 'New New Mexican Plants.' — T. D. A. Cockerell, *Sophia halictorum*, sp. n.

Gardeners' Chronicle (2 July). — *Stapelia longidens* (fig. 3).— (9 July). *Stanhopea Rodigasiana* (fig. 9). — (16 July). Fruit of *Vinca minor* (fig. 14). — (23 July). C. T. Druery, 'Apospory in Ferns.' — '*Welwitschia*' (figs. 15, 16). — (20 Aug.). A. Cogniaux, *Stanhopea Madouxiana*, sp. n. (fig. 34). — H. T. Soppitt, *Æcidium Grossulariæ* (fig. 38).

Erythea (31 July). — C. V. Piper, *Viola Flettii*, sp. n. — A. Davidson, 'Lupines of Los Angelos Country.' — A. Eastwood, 'Flora of Marin Country.'

Journal de Botanique, "1 Mai" (received about middle of July). — L. Lutz, 'Origine des canaux gommifères des Marattiacées.'— E. Bescherelle, 'Enumération des Hépatiques de Tahiti.'

Nuovo Giorn. Bot. Ital. (July). — M. Abbado, 'L'ibridismo nei vegetali' (concl.). — E. Gelmi, 'Aggiunti alla Flora del Trentino.' —G. Pons, 'Illustrazione dei *Ranunculus* del *Cat. plant. agri florentini* di P. A. Micheli.'

Oesterr. Bot. Zeitschrift (Aug.). — F. Ludwig, 'Biologische Beobachtungen an *Helleborus fœtidus*.' — F. Buchenau, '*Luzula campestris* und verwandte Arten' (concl.). — T. Wulff, 'Studien über verstopfte Spaltöffnungen' (concl.).

BOOK-NOTES, NEWS, &c.

At the meeting of the Linnean Society held on June 16th, Mr. Miller Christy read a paper entitled "Observations on the seasonal variations of elevation in a branch of Horse-Chestnut." Mr. Christy detailed the results of a series of observations, extending over three years, which he had made on the branch of a certain horse-chestnut tree growing in his garden. Having noticed for some years that the elevation of this branch above the ground was very noticeably greater during winter, when devoid of leaves, than during summer, when the foliage was on the tree, he made a series of careful observations on its various changes in elevation, due to the difference in the weight of the branch at different seasons of the year. The tree in question was a small one, some 40 ft. in height. The branch on which the observations were made was the lowest on the tree, and about 29 ft. in length. Having driven a nail into the side of this branch at a point 16 ft. 3 in. from the bole of the tree, Mr. Christy measured from time to time the distance between this nail and a brick which he had buried in the ground immediately below. This he did on forty-two occasions between April 21st, 1895, and April 25th, 1898, namely, twelve times in 1895, nine times in 1896, fourteen times in 1897, and seven times in 1898, or, on an average, about once monthly during the three years: and the rise and fall of the branch as thus observed was shown diagrammatically by means of a chart. From the results it appeared that during winter little or no change in the elevation of the branch took place. From about the middle of April to the middle of May a rapid descent—the "vernal descent"—took place, coincident with the growth of the leaves. After this ensued a short period of quiescence —the "midsummer rest." Early in August, coincident with the development of the fruit, another and more rapid descent began, which continued during September. Finally, the fall of both leaves and fruit during October was followed by a very rapid rise, the branch almost recovering, during about four weeks, the elevation which it had been gradually losing during the preceding six months or more. In the year 1897 the results were noticeably affected in consequence of the injury caused to the foliage of the tree by the extremely severe hailstorm of June 24th. The extreme range of variation in elevation observed during the three years was about 12½ in. (from 81 to 68½ in.). In addition to this periodic seasonal rise and fall, the branch appeared to be undergoing permanent descent, the maximum and minimum elevation in each succeeding year being less than in the year before. These results were, as Mr. Christy pointed out, exactly what anyone might in advance have expected to have occurred; but he thought that it might be a matter of some interest to show, as a result of precise observation, that these movements actually did occur, and to what extent.

Dr. Morris has resigned the assistant-directorship of Kew Gardens for the new post of "Imperial Commissioner of Agriculture for the West Indies." Mr. Chamberlain, when announcing the appointment in the House of Commons, said that Dr. Morris "not only had all the scientific and other knowledge in the possession of the authorities at Kew, but also special acquaintance with the West Indies." If this be the case, the loss to Kew will be serious, if not irreparable, and we can readily agree with the Secretary for the Colonies that Dr. Morris is "marked out by special qualification for an important position of this kind." *Natural Science* says:—"We fear that the learned gentleman will not be welcomed with open arms by the many botanists in these parts, which already have an excellent botanical garden and staff in Jamaica."

MR. FISHER UNWIN has published in his "Masters of Medicine" series an interesting life (price 3s. 6d.) of Dr. William Stokes (1804–1878), the eminent Dublin physician, by his son, Sir William Stokes. He was the second son of Dr. Whitley Stokes, whose name is familiar to British botanists, and in his younger days frequently accompanied his father (of whom a sympathetic sketch is given in the volume) upon his rambles after plants, though it does not appear that he followed up botanical studies in his later years. The volume is full of interesting reading and of side-lights upon Irish history.

THE *Westminster Gazette* informs us that Philip Miller "was the author of the much-admired 'Gardeners' Chronicle'"!

THE German deep-sea expedition sailed from Hamburg on August 1st on board the 'Valdivia,' one of the Hamburg-American liners, chartered for the purpose. The route to be followed is, speaking roughly, round Africa; but before going south, the expedition crossed to Leith, where they were entertained by Sir John Murray, and shown specimens, &c., obtained by the 'Challenger.' The 'Valdivia' was then to steam round the north of Scotland and test the various nets and apparatus on her way to the Cape de Verde Islands. The scientific staff on board includes a chemist and a navigator, as the work undertaken by the expedition is not exclusively biological, but also oceanographical. Besides the study of the plankton and the deep-sea fauna, there will be an investigation of the various chemical constituencies of the sea-water of different depths, and along the whole route soundings and temperatures will be taken. Questions of navigation will be dealt with, and the direction of ocean currents. The expedition expects to return to Hamburg in May, 1899.

THE last number of the *Journal of the Linnean Society* (*Botany*) contains Mr. Druce's paper "On the occurrence of *Carex helvola* in Britain," of which a brief summary was given on p. 156; and a short paper by Mr. Clement Reid "On *Limnocarpus*, a new genus of fossil plants from the tertiary deposits of Hampshire": the Latin diagnosis of the genus requires considerable revision from a literary standpoint. Mr. F. N. Williams's "Revision of the Genus *Arenaria*" is a careful and scholarly piece of work; 168 species and numerous varieties are enumerated and described.

THE July number of the Kew *Bulletin* contains a large number of diagnoses of new African plants, and is further noteworthy as having appeared during the month indicated as the date of publication.

NEW SPECIES OF CRASSULA.

By S. Schönland, M.A., Ph.D., F.L.S., & Edmund G. Baker, F.L.S.

The following twenty-six species of *Crassula* from South Africa we believe to be hitherto undescribed; we have also appended a description of *C. peploides* Drege, published by Harvey in the *Flora Capensis*, of which fuller material has now been obtained, the plant having been in cultivation. In order to satisfy ourselves in regard to the identity of certain species, we obtained the loan of a portion of Harvey's *Crassulaceæ* from Dublin, and those of the Sherardian Herbarium, Oxford. We have to return our thanks to Prof. Perceval Wright and Dr. Vines for thus assisting us.

Types of the plants described in this paper will be found in the Albany Museum Herbarium, Grahamstown; some of them are also in the National Herbarium at South Kensington. We have arranged the species as far as possible according to the sequence of the groups adopted by Harvey in the *Flora Capensis*. The genus *Bulliarda* is not now retained as distinct from *Crassula*, and the species falling under this group will be found at the end.

Crassula pallens, sp. nov. Frutex ramosus, internodiis ± 8 mm. longis. Rami teretes, pallidi, pubescentes, sæpissime basin versus efoliati, annulati. Folia crassa, subconnata, ovata vel ovato-lanceolata, sessilia, dorso convexa, supra subconcava, apice acuta vel subobtusa, 7–12 mm. longa, 3–5 mm. lata. Flores in cymos densos et terminales dispositi, pedunculis brevibus vel subbrevibus, subcrassis, pedunculis pedicellisque setis albidis et brevibus instructis, bracteis oblongis vel oblongo-lanceolatis, acutis. Calycis lobi anguste lanceolati, acuti. Petala alba, oblonga vel oblongo-oblanceolata, ± 5 mm. longa, apice mucronulata. Carpella oblique lanceolata, stylis ovariis subæquilongis, squamis clavato-cuneatis, apice subemarginatis.

Hab. Kareebergen, alt. 1500 ft.; *R. Schlechter*, No. 8310. In flower July 24, 1896.

The leaves of *C. pallens* are generally acute, while those in *C. brevifolia* are blunt, the pedicels stouter, the sepals a different shape, and the stem-branches and pedicels glabrous.

C. Macowaniana, sp. nov. Caulis erectus, ± 15 cm. altus, crassitie calami, glabriusculus, internodiis ± 8 mm. longis. Folia subteretia, subulata, crassa, dorso convexa, supra subplana vel leviter canaliculata, 4–6·5 cm. longa, sensim ad apicem attenuata, subconnata, apice acuta, internodiis multo longiora vel subæquales. Flores in cymos terminales dispositi, cymis corymbosis, multifloris, ramosis, pedunculatis, bracteis sub pedunculis et pedicellis duabus oppositis, lanceolatis, acuminatis. Pedunculi foliis longiores. Sepala brevia, ovato-lanceolata, subacuta, petalis multo breviora. Petala oblonga, vel oblongo-lanceolata, apice obtusa, basi connata, ± 3·5 mm. longa. Carpella oblique obovata, stylis subulatis,

squamis rectangulari-cuneatis, apice subemarginatis, submembranaceis, luteis.

Hab. Namaqualand; *W. Scully*, No. 191; Garies, *G. Alston*.

This belongs to *Subulares*, and was doubtfully referred to *C. ramosa* Dryander in the Albany Museum Herbarium. It differs from this plant in several points, especially in having much longer leaves.

We have named this species in honour of Prof. Macowan. As has been already shown (Journ. Bot. 1897, 484), the plant described in the *Flora Capensis*, ii. 339, under the name *C. ramosa* cannot be the plant of the *Hortus Kewensis*: it is probably identical with the plant here described. It is not represented in Harvey's Herbarium.

C. punctulata, sp. nov. Suffruticosa divaricata e basi ramosa. Caules et rami efoliati, annulati, glabri, minutissime punctulati, internodiis 3–3·5 mm. longis; ramuli ceriferi, graciles, adscendentes, 4–5 cm. longi, e basi ad medium et ultra foliata, internodiis inferioribus c. 2 mm. longis. Folia glauca, cerifera, lanceolata, acuta, basi breviter connata, vaginantia c. 8 mm. longa. Cymæ terminales, paucifloræ, pedunculatæ, pedunculis tenuibus, ·7–2 cm. longis, 2–4 bracteis sterilibus parvis munitis, floribus campanulatis breviter pedicellatis. Sepala oblongo-ovata obtusa basi subconnata 4 mm. longa. Stamina petalis subæquilonga, filamentis filiformibus. Carpella gracilia, stylis subulatis ovariis subæquilongis, squamis minutis, apice emarginatis.

Hab. In the mountains behind Vogelgat, at the mouth of the Klyn river, alt. 500 ft.; *R. Schlechter*, No. 10403.

Allied to *C. Harveyi* Britten & Bak. fil. (= *C. alpestris* Harvey, non Thunberg).

C. Flanagani, sp. nov. Herbacea, c. 25 cm. alta, simplex vel basi ramosa (?). Caulis foliatus, adscendens, infra glabra supra leviter scaber, internodiis 12–15 mm. longis. Folia faciebus glabris, margine minutissime cartilagineo-ciliata, subplana (?), obovato-spathulata, acuminata vel lanceolata, basi connata, inferiora c. 5 cm. longa, superiora sensim minora. Inflorescentiæ terminales laxe cymoso-corymbosæ, multifloræ, et ex axillis foliorum superiorum cymoso-corymbosæ, paucifloræ, floribus pedicellatis, pedicellis 1·5–2·5 mm. longis. Sepala subglabra, lanceolata, acuta, basi connata, dorso carinata, c. 1·25 mm. longa. Petala basi connata, oblongo-ovata, apice dorso mucronulata, ± 2·25 mm. longa. Stamina c. 2 mm. longa, filamentis subulatis apice attenuatis, antheris subreniformibus. Carpella c. 2 mm. longa, ovariis oblique oblongo-ovatis, stylis brevibus, subulatis, squamis minutis late subrectangularibus, versus apicem leviter dilatatis, apice subemarginatis.

Hab. East London, among rocks, alt. 100 ft.; *H. G. Flanagan*, No. 1272.

This species has a superficial resemblance to *C. natalensis* Schönland (Bull. Herb. Boiss. v. 861), but the latter has larger flowers and broader sepals and petals than *C. Flanagani*; further, its squamæ are cuneate, not broadly subrectangular. On the sheet of this species in Herb. Bolus there is the following remark: "n. sp. not in Herb. Kew, July 93, near *C. indica.*"

C. rubescens, sp. nov. Herbacea perennis, erecta simplex vel apicem versus paullo ramosa, c. 10 cm. alta. Caulis retrorso-albo-hirsutus, basi dense foliatus, supra laxe foliatus, internodiis superioribus 8–10 cm. longis. Folia sessilia, basi connata, rubescentia, inferiora oblongo-ovata, superiora late obovato-cuneata, omnia obtusa vel subobtusa, margine dense sed minute ciliata, faciebus glabris vel superiora ad basin dorso hispida. Cymæ dense multifloræ, terminales, sessiles, subcapitatæ, floribus breviter pedicellatis, bracteis foliis similibus sed minoribus. Sepala rubescentia, basi connata, lanceolata, dorso carinata, faciebus glabris, margine minutissime et irregulariter cartilagineo-ciliata, 3 mm. longa. Petala alba (?), basi connata, obovato-spathulata, apice dorso mucronulata, 3·5–4 mm. longa. Stamina petalis subæquilonga. Styli breviter subulati; squamæ minutæ, subrectangulares, apicem versus dilatatæ, rotundatæ, apice leviter emarginatæ.

Hab. Summit of Mont aux Sources, Basutoland, alt. 9500 ft.; *H. G. Flanagan*, No. 1834.

Very closely allied to *C. stachyera* E. Z.

C. Rudolfi, sp. nov. Perennis. Caulis suffruticosus, erectus, teres, ramulis setis albis et brevibus tectis, internodiis ± 7 mm. longis. Folia subconnata, subtrigona, anguste oblongo-lanceolata, subcrassa, margine ciliata, faciebus glabris, apice acutis, 1·2 mm. longa, internodiis longiora. Flores sessiles in cymulos terminales dispositi, cymulis paniculatis, paucifloris, bracteis ovatis, dorso convexis, intus subplanis. Sepala dorso convexa, subglabra, margine ciliata, lanceolata, ± 2 mm. longa. Petala apice leviter recurvata, oblongo-spathulata, 3 mm. longa. Carpella oblique lanceolata, apicem versus gradatim attenuata, stylus subnullus, squamis cuneatim rectangularibus.

Hab. Brackdamm, on hills, alt. 1500 ft.; *R. Schlechter*, No. 11118.

Allied to *C. Whiteheadii* Harvey. Named in honour of the collector, Herr Rudolf Schlechter.

We have compared this plant with *C. Whiteheadii* Harvey, a specimen of which exists in Harvey's Herbarium. There are several points of difference: the leaves are longer than the internodes, which they are not in *C. Whiteheadii*, and the styles are not shortly subulate. The cymules in *C. Rudolfi* are terminal, compact, and usually more than 3–5-flowered; they are paniculately arranged. *C. Whiteheadii* Harvey has been gathered by Mr. W. C. Scully in Namaqualand, No. 197.

C. cyclophylla, sp. nov. Radix fibrosa. Caulis simplex, herbaceus, glabriusculus, in specimine nostro c. 16 cm. longus, nodiis remotis (internodiis 2·5–3·0 cm. longis). Folia suborbicularia vel late ovata, opposita, patentia, viridia, plana, membranacea, apice subacuta, basi rotundata, petiolata, margine graciliter serrata, lamina 1·8–2·2 cm. longa, 1·5–1·8 cm. lata; petioli 3–5 mm. longi.

Inflorescentiæ terminales ramosæ. Cymæ pedunculatæ paniculatæ, pedicellis gracilibus. Bracteæ sub pedunculis et pedicellis duæ oppositæ, minutissimæ. Sepala brevia, lineari-lanceolata, ± 1 mm. longa, petalis multo breviora, apice subacuta. Petala angusti-lanceolata, acuminata, ± 4 mm. longa. Carpella oblique lanceolata, stylis subulatis, petalis brevioribus, squamis subrectangularibus.

Hab. Perie bush, King William's Town; *S. Schönland*, No. 847.

This plant is allied to *C. spathulata* Thunberg and *C. pellucida* L. (= *C. centauroides* L.). The round shortly-petioled leaves serrate at the margin, not broadly cordate, but rounded at the base, at once distinguish this plant from its near allies. The inflorescence is subsimilar to that of *C. spathulata* Thunb., but in this case distinctly terminal, not at all lateral, and apparently not so consistently divaricate.

C. latispathulata, sp. nov. Caulis in specimine nostro 16–20 cm. longus, internodiis c. 1·8 cm. longis, inferne efoliatus ad nodos radicans. Folia opposita, plana, glabra, internodiis longiora, ovata vel elliptica, margine crenata vel crenato-serrata, ad basin in petiolum gradatim attenuata, apice acuta, cum petiolis 3–3·3 cm. longa, 1·2–1·5 cm. lata. Flores in cymos terminales et paniculatos dispositi. Bracteæ sub pedunculis pedicellisque duæ oppositæ, minutæ vel minutissimæ. Sepala oblonga, obtusa, petalis multo breviora. Petala angusti-lanceolata-acuminata, alba, c. 3·5 mm. longa. Carpella oblique lanceolata, stylis filiformibus, squamis brevibus subrectangularibus.

Hab. Zuurberg, alt. 3000 ft.; *J. M. Wood*, No. 457. Herb. Mus. Brit.

Allied to *C. cyclophylla* and *C. Inandensis*. This plant differs from *C. cyclophylla* in the shape of the lamina of the leaf, which is considerably longer than broad, and at the base tapers gradually to the petiole. The shape of the leaves is very similar in *C. Inandensis*, but the branching of the inflorescence is entirely different, the peduncles in *C. latispathulata* being dichotomously branched. The leaves and flowers are smaller in *C. latispathulata* than in *C. Inandensis*.

C. Inandensis, sp. nov. Caulis procumbens, ad nodos inferiores radicans, in specimine nostro 30 cm. longus, internodiis 3–4·7 cm. longis. Folia opposita minute squamulosa, internodiis breviora vel interdum longiora, ovata vel elliptica, margine denticulata vel subdenticulata, ad basin in petiolum gradatim attenuata, plana, apice acuta, cum petiolis 4–6 cm. longa, 1·5–2·8 cm. lata. Flores in cymos trichotomos et terminales dispositi. Bracteæ sub pedunculis pedicellisque duæ oppositæ, minutissimæ. Sepala oblonga, obtusa, petalis multo breviora. Petala alba, concava, angusti-lanceolata, acuminata, c. 4 mm. longa. Carpella oblique lanceolata, stylis filiformibus, squamis subrectangularibus.

Hab. Natal: Inanda; *J. M. Wood*, No. 764. In flower, Dec. 1880. Herb. Mus. Brit.

This plant is allied to *C. sarmentosa* Harvey, and, like that plant, roots at the lower nodes. The stem is not so stout as in *C. sarmen-*

tosa, and the leaves are different, the base in the present species gradually tapering to the petiole and not rounded. The flowers are in a terminal trichotomously branched cyme; the petals narrow and acuminate, and smaller than in *C. sarmentosa*. It is also allied to *C. cyclophylla* Schönl. & Bak. fil. It differs from this species markedly in the shape of the lamina of the leaves.

C. hirsuta, sp. nov. Radix fibrosa, annua. Caulis filiformis, volubilis, erectus vel adscendens, teretiusculus, pubescens, ramosus, 4–7 cm. longus. Rami nunc erecto-patentes, nunc adscendentes, teretes, subbrunnei vel rubescentes. Folia lanceolata vel lineari-lanceolata, hirsuta, acuta, sessilia, 4–8 mm. longa. Flores minuti, pentameri, cymoso-paniculati, interdum axillis dichotomis floriferis, omnes breviter pedicellati. Calycis lobi oblongi, obtusi, hirsuti, vix 1 mm. longi. Petala ± ·75 mm. longa, subovata, basi connata. Ovarium papillosum, oblique ovatum, stylis subulatis, brevibus, squamis spathulatis.

Hab. Messklip, on hills, alt. 2000 ft.; *R. Schlechter*. No. 11283. In flower Sept. 16, 1897.

This plant belongs to the *Glomeratæ*, and is allied to *C. glabra* Haworth, a type of which exists in the National Herbarium at South Kensington. The future monographer of this group will find that the question of the identity of *Crassula muscosa* Linn. Pl. Afr. Rar. 10 (1760), with *C. glabra* Haworth will have to be considered, *C. muscosa* L. is of course much the earlier; the only specimens we have seen bearing this name are in the Sherardian Herbarium, Oxford.* *C. glomerata* Berg, Descr. Pl. 85 & 86 (1767), will also require attention, as one of the plants on which this is founded is in Plukenet's Herbarium, and is *C. decumbens* E. & Z. *C. hirsuta* seems easily distinguishable from the other members of this group —one very obvious character being the character of the indumentum.

C. oblanceolata, sp. nov. Annua. Radix filiformis descendens. Caules multi ex eadem radice orti, adscendentes, herbacei, sæpe trichotomi, ramosi. Folia oblanceolata vel oblongo-obovata, 5–7 mm. longa, sessilia, margine integra, plerumque patentia, opposita, obtusiuscula, basi cuneata. Flores pentameri, axillares et terminales, pedicellis filiformibus. Sepala obtusa, oblonga, corollam subæquantia. Petala oblongo-ovata, subacuta, circiter 1·5 mm. longa, alba. Stamina petalis breviora. Styli breviter subulati, squamis e basi cuneata abrupte et latissime sed breviter transversim dilatatis.

Hab. Kareebergen, alt. 1800 ft.; *R. Schlechter*, No. 8306. In flower July 24, 1896.

This plant belongs to the *Glomeratæ*, and has been referred to *C. albicaulis* Harvey; but we have compared it with the type in Harvey's Herbarium, and it is quite distinct. It is a much more slender plant than *C. albicaulis*, but, like that species, it has many stems from the crown which spread on all sides, but they are only at most 4–5 cm. long, whereas in *C. albicaulis* they are 15 cm. or more. Another difference is that in *albicaulis* the sepals are about two-thirds of the length of the corolla, whereas in the present species the sepals and petals are nearly the same length. The squamæ are rather noticeable on account of their somewhat peculiar shape—the short stipe is abruptly transversely dilated, and subsimilar in outline to the section of an *Agaricus*. A plant gathered by R. Schlechter, No. 4920, at Piquenierskloof, alt. 850 ft., may be the same as above.

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* In the original description of *C. muscosa* L., Ficoides africana annua minima muscosa, Hermann, Par. 170, is quoted as a synonym. The value of the Sherardian specimen is perhaps not apparent until one remembers that Hermann's *Paradisus Batavus* was a posthumous work, and was edited with a preface by W. Sherard.

C. Promontorii, sp. nov. Radix tuberosa. Caulis herbaceus, sæpissime simplex, ± 4 cm. altus, interdum altior. Folia opposita, patentia vel erecto-patentia, petiolata, membranacea, glabra, lamina rotunda, ovata, vel late ovata, vel elliptica, basi cuneata, margine crenata, vel crenato-serrata, 1·2–2·0 cm. lata, cum petiolis 2–2·8 cm. longa. Flores cymosi, pedicellis gracilibus. Calycis lobi lanceolati, acuti. Petala ovata, acuta, 5 mm. longa. Carpella petalis breviora, stylis subulatis, squamis rectangulari-cuneatis.

Hab. Table Mountain, Kasteelspoort, on rocks; *Capt. Wolley Dod*, No. 1624.

Belongs to *Crenato-lobatæ*. This seems almost certainly the plant Harvey took for *C. dentata* Thunberg (see specimens in his herbarium). *C. dentata* Thunberg, var. *α minor* Herb. Harvey, is a more slender plant. *Petrogeton typicum* E. Z. (= *C. Petrogeton* Walpers) belongs to this variety. We have carefully compared Thunberg's description of his *dentata* (*Flora Capensis*, 293) with the present species, and as there are several points of difference, we have ventured to describe the latter. The stem in the present species is about 4 cm. high, the plants in the Harveian Herbarium being rather more, and the leaves are not cordate, the original description (of *C. dentata*) describing the stem as "vix ullus vel brevissimus," and the leaves as "cordata." Harvey remarks *C. dentata* Thunb. has "something the habit of *Chrysosplenium oppositifolium*," a remark which is applicable to the present species. The two plants in Harvey's Herbarium referable to *C. Promontorii* were collected, one by Harvey himself, the other by C. Wright, No. 558, both without definite locality.

C. confusa, sp. nov. Planta omnino glabra. Caulis herbaceus, ± 4 cm. altus. Folia subreniformia, in statu siccitatis, membranacea, petiolata, basi truncata, margine integra vel subintegra, viridia, lamina 1·2–1·8 cm. lata, 7–9 mm. longa, petioli 5–8 mm. longi, patentia vel erecto-patentia. Flores cymosi, pedicellis gracilibus. Calycis lobi petalis triplo breviores. Petala ovato-acuminata, 2–2·5 mm. longa. Carpella oblique obovata, stylis subulatis, tenuiter recurvis, squamis ovatis, apice obtusis.

Hab. Koudeberg, alt. 2400 ft.; *R. Schlechter*, No. 8727. In flower Aug. 28, 1896.

This plant belongs to the *Crenato-lobatæ*, and is closely allied to *C. nemorosa* Endlicher. It may be well to contrast the differences these species exhibit:—

C. NEMOROSA Endl.	C. CONFUSA.
Flowers in interrupted racemose panicle. Pedicels thread-like.	*Flowers* in complicated cymose inflorescence *not* an interrupted racemose panicle, smaller than in *C. nemorosa* Endl., and with shorter pedicels.
Calyx-lobes ovate, subacute, two-thirds of corolla.	*Calyx-lobes* ovate, obtuse, one-third of corolla.
Petals lanceolate, acute, or acuminate.	*Petals* ovate-acuminate.
Styles shortly subulate.	*Styles* subulate.

The styles are slender and recurved—the connectives are comparatively broad, as in the other species of the section.

C. pachystemon, sp. nov. Perennis. Caulis erectus, ramosus; rami adscendentes, herbacei, pubescentes, ± 15 cm. longi, internodiis 1·7–2·0 cm. longis. Folia lanceolata vel oblanceolata, sessilia, basi connata, subcrassa, erecto-patentia, utrinque pubescentia, margine ciliata, integra, apice acuta, 2–2·5 cm. longa, 5–6 mm. lata, internodiis longiora. Flores in cymos terminales dispositi. Cymæ pauciflorae, compactæ, paniculatim dispositæ, pedunculis pedicellisque pubescentibus, bracteis sub pedunculis et pedicellis duabus oppositis, foliis subsimilibus sed multo minoribus, lanceolatis, sessilibus, acutis. Sepala dorso convexa, intus subplana, lanceolata, basi connata, hispida, margine ciliata, petalis fere æquilongia. Petala alba, minutissime papillosa, c. 2·5 mm. longa, oblonga vel oblongo-oblanceolata, apice subumbonata. Carpella oblique lanceolata, apicem versus gradatim attenuata, squamis ovato-rectangularibus, apice emarginatis.

Hab. Rocky hillsides near Graff Reinet, alt. 2600 ft.; *H. Bolus*, No. 437. Windvogelberg, near Cathcart; *J. R. Sim.*

Allied to *C. mollis* Thunberg in Nova Acta Acad. Leopoldino-Carolinæ, vi. 340 (1778); see also Journ. Bot. 1897, 480. Differs from this species in several points, the leaves of *C. mollis* being terete, triquetrous, and generally glabrous, and the inflorescence much more branched. The inflorescence in *C. pachystemon* is terminal, the flowers being in compact few-flowered cymes. The cymes are paniculately arranged; the peduncles are fairly stout, and, together with the pedicels, are rufous pubescent. The sepals are not quite as long as the petals—the filaments are remarkably thick—the styles are not subulate, but the carpel tapers gradually from the base upwards. Though nearly allied to some species of § *Sphæritis*, it has the petals of *Eucrassula*.

C. namaquensis, sp. nov. Perennis e basi ramosa, caulibus brevibus, dense foliatis, radice lignosa, 9–12 cm. longa, descendente. Folia subrosulata, cæspitosa, semiteretia, dorso convexa, supra subplana, oblonga vel oblongo-lanceolata, apice acuta, setis albidis et brevibus utrinque instructa, 2–2·8 cm. longa, ± 7 mm. lata. Inflorescentia c. 3 cm. longa terminalis, pedunculata, cymis paucifloris capitatis compositis, laxe paniculata vel corymbosa, pedunculo 5–7 cm. longo, 2–4-foliis parvis ovatis hirsutis connato-vaginatis

bracteis similibus munito, pilis albis retrorsis tecto, floribus sessilibus. Sepala basi connata, ovata, ± 1 mm. longa, dorso convexa, hirsuta. Petala pallide lutescentia, basi connata, ovata, apicem versus subulata, canaliculata, 3 mm. longa. Stamina c. 1·5 mm. longa, filamentis subulatis, antheris ovatis. Carpella quam stamina paullo breviora, oblique oblonga, stylis subnullis, stigmatibus pone carpelli apicem dorsaliter impositis, squamis membranaceis, truncatis, cuneatis.

Hab. Namaqualand: Garies; *Mr. G. Alston.* I'aus, on hills, alt. 2300 ft.; *R. Schlechter*, No. 11210.

Belongs to *Sphæritis.* This is a densely cæspitose species allied to *C. clavifolia* E. Meyer. The leaves are hairy and thick. The peduncles are dark red, with whitish hairs, bearing bracts about the middle which are connate and subvaginate, hairy and acute, and also similar bracts below the branching. The petals are creamy white. The stamens are shorter than the petals, the anthers dorsifixed. The stigma is decidedly dorsal; the squamæ are rectangular-cuneate, membranous, and orange-coloured.

C. (§ SPHÆRITIS) **hispida**, sp. nov. Suffruticosa e basi ramosissima. Rami graciles basi lignosi dense foliati retrorso hispidi ad 20 cm. longi, internodiis c. 4 mm. longis. Folia ovato-lanceolata acuta, facie sparse hispida, dorso hispida, margine ciliata, basi subconnata, inferiora c. 1 cm. longa, superiora sensim minora. Inflorescentiæ terminales subsessiles capitatæ diam. 5–15 mm., bracteis ovato-lanceolatis dorso scabridis margine ciliatis, floribus subsessilibus. Sepala linearia subacuta serrulata intus concava glabra, dorso scabrida subcarinata sublibera c. 3 mm. longa. Petala sepalis subæquilonga subpanduriformia apice sensim contracta canaliculata. Stamina c. 1·5 mm. longa, filamentis filiformibus antheris late ovatis. Carpella staminis subæquilonga, stylis subnullis, squamis cuneatis apice rotundatis c. 0·8 mm. longis.

Described from specimens in Herb. Bolus.

"In collibus saxosis prope thermas Montagu, alt. 800 ft. leg. H. Bolus (No. 6704), Dec., 1892."

C. (§ SPHÆRITIS) **multiflora**, sp. nov. Suffruticosa ramosa vel subsimplex robusta. Caulis ramulique teretes glabri, internodiis inferioribus c. 4 mm. longis superioribus sensim minoribus. Folia perfoliata lanceolata acuta, faciebus glabris, margine cartilagineo-ciliata, inferiora c. 7 cm. longa superiora sensim minora. Inflorescentiæ terminales vel ex axillis foliorum superiorum laterales, dense multifloræ cymoso-corymbosæ, bracteis foliis similibus sed minoribus, floribus pedicellatis. Sepala sublibera serrulata, dorso carinata lanceolata obtusiuscula c. 3 mm. longa. Petala basi connata medio panduriformia apice sensim contracta canaliculata 4 mm. longa. Stamina c. 2·5 mm. longa filamentis filiformibus antheris ovatis. Carpella staminis subæquilonga stylis brevissimis ovariis subovatis, squamis cuneatis apice submarginatis c. 0·8 mm. longis.

Described from specimens in Herb. Bolus.

"In convalle inter saxa prope thermas, alt. 800 ft. leg. H. Bolus (No. 6702), Dec., 1892."

In Herb. Bolus there are two specimens, the largest of which is about 45 cm. long, but both are only portions of a plant or plants which, even if only slightly larger, must belong to a very handsome and striking species. One of these specimens is branched 16 cm. below the top, the other is simple except that one of the uppermost nodes bears a small inflorescence. The habit of the plant as preserved in these specimens is somewhat similar to that of *C. vaginata* and *C. rubicunda.*

C. scalaris, sp. nov. Perennis. Caulis erectus, simplex, ad basin dense foliosus, teres, ± 20 cm. altus, pubescens, crassitie quam penna minor. Folia radicalia cuneatim obovata, vel late obovata, basi in petiolum attenuata, apice rotundata, præsertim subtus hirsuta, margine ciliata, cum petiolis ± 3 cm. longa, 2–2·5 cm. lata; caulinorum duo infima obovata sessilia, foliis radicalibus consimilia, superiora oblonga, basi connata. Cymuli ad nodos sessiles. Sepala lanceolata, hirsuta et ciliata, petalis multo breviora. Petala circiter 4 mm. longa, inferne coalita, superne in apicem longam et canaliculatam attenuata. Carpella oblique obovata, squamis cuneatis, apice emarginatis.

Hab. Bullhoek, alt. 700 ft.; *R. Schlechter*, No. 8382.

This plant is allied to *C. tomentosa* Thunberg, *C. interrupta* E. Meyer, and *C. glabrifolia* Harv., and therefore belongs to *Sphæritis.* Stem densely leafy at the base, with distant leaf-pairs above. The radical leaves are cuneate, obovate, hairy, and ciliate, while those of *tomentosa* are described by Thunberg as lanceolate. The cauline leaves vary in shape according to their position on the stem—the lowest are very similar to the radical leaves, those higher up are oblong or oblanceolate, and shorter than the internodes. The cymules of flowers are capitate and sessile, or subsessile, at the nodes, forming an interrupted spiked thyrsus or spike. The clusters of flowers are 1·2–1·8 cm. apart. The thyrsus in the specimen before us consists of eight verticillasters. *C. interrupta* E. Meyer seems quite distinct, though certainly allied; it is a smaller, hoary species with much shorter leaves. As has been previously stated, it is somewhat doubtful whether the plants in Harvey's Herbarium under *C. tomentosa* are Thunberg's species (see Journ. Bot. 1897, 481).

C. leucantha, sp. nov. Perennis ramis foliatis virgatis glabris basi lignosis, internodiis inferioribus c. 4 mm. longis, superioribus sensim longioribus ad 15 mm. longis; folia oblonga vel oblongo-obovata sparse pubescentia vel glabra, margine breviter cartilagineo-ciliata breviter connato-vaginata, inferiora c. 25 mm. longa, superiora sensim minora. Inflorescentia terminalis capitata vel subcorymbosa breviter pedunculata floribus breviter pedicellatis bracteis bracteolisque lanceolatis margine cartilagineo-ciliatis; sepala oblongo-linearia basi connata lobis c. 2 mm. longis dorso carinatis margine minute cartilagineo ciliatis; petala alba basi ovata versus apicem subulata canaliculata c. 4 mm. longa, stamina carpellæque brevia antheris ovatis, ovariis oblique ovatis stylis brevioribus, squamis subrectangularibus truncatis, apice leviter dilatatis.

Described from two branches in Herb. Alb. Mus.

Hab. Howhoek, 2000 ft.; *R. Schlechter*, 7378, Feb. 1896.

The two branches in Herb. Albany Museum are respectively 21 and 23 cm. long. The diameter of the inflorescence is in both cases 2·5 cm.

C. anomala, sp. nov. Perennis ramis virgatis basi dense foliatis supra subscapiformibus internodis inf. c. 1 cm. longis, superioribus ad 6 cm. longis pubescentibus; folia inferiora connata vel subconnata suborbicularia cuneata vel late obovato-cuneata 2–2·5 cm. longa, 1·5–2 cm. lata omnia utrinque pubescentia margine breviter ciliata, 2–4 superiora sterilia depauperata subovata 5–7 mm. longa. Inflorescentia paniculata vel subspicata. Flores breviter pedicellati in cymas subcapitatas conferti, cymis lateralibus et terminalibus pedunculatis pedunculis 3–23 mm. longis. Sepala basi connata oblongo-linearia apice obtusa lobis c. 2 mm. longis dorso carinatis pubescentibus margine ciliatis intus concavis glabris, petala 2·5–3 mm. longa pallide lutea (?) bracteis bracteolisque foliis depauperatis similibus sed minoribus panduriformia basi connata supra more sect. *Sphæritidis* subulata canaliculata dorso apice more sect. *Globuleæ* globulifera; filamenta brevia, antheræ ovatæ; carpella oblique oblonga, stigmatis subsessilibus, squamis subrectangularibus apice rotundatis subemarginatis.

Described from two branches in Herb. Alb. Museum.

Hab. French hoek in montibus, 2000 ft., by *R. Schlechter*, 9317, Nov. 1896.

This plant combines to a certain extent the floral characters of *Sphæritis* and *Globulea*, though it seems to me more nearly allied to the species placed under the former section.

The two branches I have seen are respectively 32 and 23·5 cm. long. In the former the lower densely foliate region is 9 cm. long; then follows a portion with one pair of depauperated leaves 12 mm. long, and the inflorescence is 11 mm. long. The corresponding measurements of the other branch are 5 cm., 13·5 cm., 5 cm. Here the second region has two pairs of depauperated leaves.

C. subacaulis, sp. nov. Acaulis vel subacaulis. Folia omnia radicalia, adscendentia, imbricantia, basi connata, oblonga vel oblongo-lanceolata, apice acuta vel subacuta, crassa, 2·5–3·8 cm. longa, margine subserrata, glabra vel glabriuscula. Pedunculus herbaceus, simplex, scapiformis, ± 20 cm. altus, bracteis membranaceis basi connatis. Cymuli globosi, dense fasciculati, sessiles, vel pedicellati. Sepala oblonga, ciliata, obtusa, petalis breviora. Petala ± 3 mm. longa. Carpella 2·5 mm. longa, stigmate dorsali, squamis rectangulari-cuneatis.

Hab. Steinkopf, on hills, alt. 2900 ft.; *R. Schlechter*, No. 11498. In flower Oct. 4, 1897.

This plant belongs to § *Globulea*. The leaves are all radical or subradical, and in this respect resembles *C. nudicaulis* L. The peduncle is scape-like, the dense globose cymules of flowers being capitate, the lower ones being sessile or shortly stalked. This plant is also closely allied to *C. obvallata* L. I have compared it with Harvey's specimens, and find the leaves in *C. subacaulis* are narrower, and not cartilagineo-ciliate, as in that species.

C. (Bulliarda) **aphylla**, sp. nov. Annua glabra pusilla, c. 1·5–2 cm. alta. Caulis inferne simplex supra parum ramosus, erectus, internodiis basi subteretis apicem versus inflatis applanatis summo excavatis. Flores 4-meri (vel rare 3-meri ?), terminales sessiles. Calycis lobi minuti subtrigoni. Petala late ovata c. 2 mm. longa. Stamina petalis subæquilongis filamentis basi linearibus apice constrictis, antheris late ovatis. Styli breves subulati, ovaria lata, ovula 2–4, squamæ . . . .

Hab. Brontjes river, alt. 2300 ft., Aug. 8, 1896; leg. *R. Schlechter*, No. 8664.

"Amongst crassulaceous plants this tiny species is perhaps Mr. Schlechter's most interesting discovery, owing to the complete absence of leaves. Their physiological functions are evidently entirely undertaken by the stem, in which the upper parts of the internodes are swollen, thus giving the plant the aspect of a miniature *Opuntia*. I could not demonstrate to my satisfaction that squamæ were present in the flowers, as I did not wish to sacrifice too much of the material at my disposal."—S. S.

C. Lambertiana, sp. nov. "Annua pusilla glabra 2–5 cm. alta, caulis dichotome ramosus subpellucidus filiformis sparse foliatus, internodiis inferioribus 1–1·8 cm. longis. Folia plana (?) obovata lanceolata basi attenuata subpetiolata inferiora 1–2 cm. longa, superiora sensim minora. Flores tetrameri vel rare pentameri in ramulis terminales, pedicellis tenuissimis, inferioribus ad 1·3 cm. longis superioribus 3–5 mm. longis. Sepala obovata lanceolata sublibera 2–2·5 mm. longa. Petala ovata obtusa sublibera alba c. 1–1·2 mm. longa. Stamina petalis subæquilonga, filamentis linearibus apice constrictis, antheris late ovatis. Carpella petalis subæquilonga, ovulis 5–6, stylis brevissimis, squamis quam carpellis triplo brevioribus e basi linearibus sursum dilatatis subbilobis, rotundatis.

Hab. Lamberts Bay, alt. 10 ft., Aug. 16, 1896; leg. *R. Schlechter*, No. 8539.

"*C. Lambertiana* is nearly allied to *C. trichotoma* Schönland. Our species is chiefly distinguished by its broader leaves and the comparative length of the petals, which here are only about half the length of the sepals. I may mention that it appeared to me that the anthers in this species open by means of longitudinal valves. My material was, however, not sufficient to decide this point. If confirmed, it would be advisable to make *C. Lambertiana* the type of a new genus."—S. S.

C. papillosa, sp. nov. Annua? Caules tenues, herbacei, e nodis radicantes, 4–6 cm. longi. Folia circiter 4 mm. longa, internodiis breviora oblique ovata in petiolum brevem attenuata, basi connata apice subacuta, lamina cartilagineo-ciliata. Flores terminales solitarii, breviter pedicellata, tetrameri. Sepala oblonga vel oblongo-ovata, apice obtusa, basi parum connata, circiter 1·5 mm. longa, e basi glabra, sursum dorso marginibusque minute papillosa.

Petala basi parum connata, circiter 2 mm. longa, ovato-lanceolata. Ovaria oblique ovata, stylis subulatis, squamis incudiformibus.

Hab. Matroosberg; *Marloth*, No. 1999.

Allied to *C. alpina* Endlicher.

C. Dodii, sp. nov. Annua radice tenuissima descendente. Caules plures ex eadem radice orti, adscendentes, filiformes subsimplex vel parum ramosi, 2–3 cm. longi. Folia radicalia spathulata vel ovata, caulina spathulata vel oblanceolata, membranacea, apice obtusa, basi ± gradatim in petiolum attenuata, margine integra cum petiolis 4–8 mm. longa, internodiis breviora. Flores pentameri caulium apices versus ± aggregati, pedunculi pedicellique gracillimi. Sepala ovata vel oblongo-ovata. Petala oblongo-ovata, 1·5 mm. longa. Carpella oblique obovata, stylis brevibus, tenuibus, squamis apicem versum dilatatis, apice truncatis.

Hab. Vanrhynsdorp, on hills, alt. 300 ft.; *R. Schlechter*, No. 10994. In flower and fruit Aug. 26, 1897.

Named in honour of Capt. Wolley Dod, who has recently made considerable collections at the Cape.

There seems some confusion in regard to *Bulliarda brevifolia* E. & Z. in Harvey & Sonder, Fl. Cap. (ii. 330). There are certainly two plants under this name in Harvey's Herbarium, the true plant of Ecklon and Zeyher, and a plant represented by Wright, No. 549, from Simons Bay, which is either identical with or very closely allied to *C. Dodii*. The present species is a slender filiform-stemmed little annual, differing in both leaves and flowers from *B. brevifolia* E. & Z.

C. nana, sp. nov. Omnium specierum hucusque cognitarum hæc est minutissima. Radix brevis tenuissima descendens. Planta vix 1 cm. alta. Folia obovata, 3 mm. longa, crassiuscula, caulina late obovata, basi angustata. Dichasium pauciflorum subumbellatum. Bracteæ foliis similes, inferiores vix minores. Flores tetrameri. Sepala oblongo-obovata, dorso pubescentia. Petala triangularia. Sepala petalaque circiter 1 mm. longa. Carpella oblique ovata, stylis brevibus tenuibus, squamis spathulatis.

Hab. Zuur Fontein, alt. 150 ft.; *R. Schlechter*, No. 8560. In flower and fruit Aug. 17, 1896.

This interesting little plant is, so far as we know, the smallest representative of the genus. The sepals and petals are approximately the same length, the sepals being dorsally pubescent and blunt. It is allied to *C. alpina* Endlicher (= *Bulliarda alpina* E. & Z.).

C. PEPLOIDES Harvey, Fl. Cap. ii. 355. The following notes are from a plant received in June, 1897, from Mr. J. R. Sim, and collected on the Windvogelberg, near Cathcart; it was grown at Grahamstown, and flowered in December, 1897. The leaves agreed at first with the description, but under cultivation became longer than in the type (length 17 mm. as against 11 mm.). The stem is very pale, almost white, nearly terete, with two opposite shallow grooves just above each pair of leaves; leaves slightly rounded on back, almost flat above, also with shallow median grooves both above and below. Calyx-lobes oblong-obovate, blunt, rounded at the back with obtuse interspaces. Petals oblong-ovate, white, strongly 3-nerved above, filaments and carpels white, pollen pale yellow. Stamens and carpels almost the length of the petals; filaments subulate, attenuated; anthers ovate; styles subulate, nearly size of ovary; squamæ rectangular, apex emarginate.

DECADES PLANTARUM NOVARUM AUSTRO-AFRICANARUM.

Auctore R. Schlechter.

(Continued from p. 318.)

DECAS IX.

81. **Hermannia asbestina,** sp. n. Fruticulus humilis 1–2-pedalis, ramosus, rigidus; ramulis erecto-patentibus primum dense stellato-pubescentibus demum lignescentibus glabratis; foliis parvulis obovato-ellipticis, basi in petiolum brevem angustatis dimidio superiore 5–7-dentatis, utrinque dense pilis stellatis minutis obtectis, 0·5–0·8 cm. longis, medio fere 0·3–0·5 cm. latis; stipulis minutis deciduis; floribus axillaribus singulis, nutantibus, roseis; pedicello filiformi stellato-pubescente, 1–1·2 cm. longo; calyce campanulato late aperto, 0·6 cm. longo, stellato puberulo mox membranescente, reticulato-nervoso, segmentis tubo fere æquilongis, lanceolatis acutis, erecto-patentibus; petalis oblanceolato-spathulatis obtusis, utrinque glaberrimis, calyci fere duplo longioribus; filamentis e basi lineari-cuneata planis, setis sparsis margine ciliatis, valde acuminatis, 0·4 cm. longis, antheris angustis, elongatis, apice bifidis, margine ciliatis filamentorum longitudine; stylo filiformi acuto, dimidio inferiore hispidulo, dimidio superiore glaberrimo, 0·5 cm. longo; ovario stipitato, granuloso-punctato, 10-cornuto, cornubus obtusis subbarbatis.

In regione Kalaharica: In lapidosis montium "Asbestos Bergen," Dec. 1894; *Dr. R. Marloth*, No. 2057.

A near ally to *H. spinosa* E. Mey., from the Niewe Veld, but with less rigid habit, pedicels not transformed into divergent spines, a stellate calyx, filaments of the same length as the anthers, and a glabrescent ovary which is covered with scale-like grains and bears ten barbate horns. The highly-stipitate ovary is remarkable. I do not know whether this is so or not in *H. spinosa.*

82. **Lotononis macra,** sp. n. Suffrutex perennis adscendens, 20–25 cm. alta; caule simplici vel subsimplici filiformi, gracili, tereti, piloso, laxe foliato, apice nudo; foliis 3-foliolatis, erecto-patentibus, foliolis linearibus acutis, pilosis, 1·5–2 cm. longis, lateralibus subfalcatis, petiolo piloso, 1 cm. longo; stipulis binis erectis, linearibus acutis, pilosis, petiolo paulo longioribus; pedunculo (si licet appellare) terminali filiformi piloso, 4·5–6 cm. longo, umbellatim pauci(1–3)-floro bracteis stipulis omnino conformibus,

pilosis, pedicello piloso paulo longioribus; floribus aureis pro genere magnis; calyce campanulato-piloso, fere 0·8 cm. longo, segmentis lineari-lanceolatis tubo longioribus; vexillo unguiculato, lamina suborbiculari, ungue incluso 1·6 cm. longo, 1 cm. lato, extus medio apicem versus pilosulo cæterum glabro, alis carinæ paulo longioribus, ungue lineari lamina oblique falcato-oblonga obtusa glaberrima, basi margine superiore breviter auriculata, 1·8 cm. longis; carina glaberrima, obtusa, apice breviter excisa 1·6 cm. longa; ovario sericeo-piloso, pluriovulato, stylo filiformi glaberrimo.

In regione austro-occidentali: In clivo argillaceo prope Wupperthal, in ditione Clanwilliam, alt. c. 3500 ped., Sept. 1896; *R. Schlechter.*

This belongs to the section *Telina* in the neighbourhood of *L. varia* Steud., and *L. macrocarpa* E. & Z. It is easily distinguished by the habit, the narrow pilose leaves, the stipules, and the pilose vexillum and ovary. It is evidently a rare plant, as I could only find two specimens, in spite of careful searching. It was growing in clayey soil amongst *Elytropappus Rhinocerotis* Less.

83. **Vernonia collina,** sp. n. Herba perennis plantaginea, c. 10 cm. alta; foliis radicalibus, rosulatis obovato-spathulatis obtusis, dimidio inferiore integris, dimidio superiore irregulariter crenulato-dentatis, subcoriaceis, superne glabris, subtus minute (tamen dense) impresso-punctatis, 1·5–2·5 cm. longis, supra medium 1–1·6 cm. latis; scapo (si licet appellare) stricto puberulo, apice pauci-capitato; capitulis 1·2–1·3 cm. diametientibus, breviter pedunculatis, pedunculis puberulis, involucro vix æquilongis; involucro campanulato, 0·8 cm. alto, foliolis linearibus vel lineari-lanceolatis acutis vel acuminatis, dorso puberulis; floribus tubulosis e basi anguste cylindrica dimidio superiore dilatatis, extus granulis albidis ornatis, segmentis oblongis vel lineari-oblongis obtusis, erecto-patentibus inæquilongis, involucrum superantibus; antheris anguste linearibus glabris, basi breviter sagittatis, 0·3 cm. longis, stylo filiformi glabro, brachiis hispidulis filiformibus tubum antherarum bene excedentibus, divaricatis, acheniis cylindrico-oblongis hispidulis, pappo biseriato, serie interiore pilorum asperum, serie exteriore squamellarum minutarum subpiliformium.

In regione austro-orientali: In clivo graminoso in summo monte "Little Noodsberg" (Nataliæ), alt. c. 3800 ped., Oct. 1894; *J. Thode*, No. 150.

This rare little plant should be placed next to *V. Dregeana* Schulz Bip., of which it has the habit, differing from it, however, by its stouter growth, larger heads on short pedicels, the different indument, and the achenes. I have seen it as yet only in Mr. Thode's collection, who kindly gave me a specimen.

84. **Felicia amelloides,** sp. n. Fruticulus erectus ramosus, 20–30 cm. altus, ramulis teretibus, dense foliatis, demum glabrescentibus; foliis oppositis erectis anguste linearibus obtusis hispidulis, crassiusculis, 0·5–1 cm. longis; pedunculis terminalibus medio bracteolatis vel subnudis, hispidulis, 1·5–2 cm. longis; capitulis c. 2·5 cm. diametientibus, singulis; involucri foliolis subuniseriatis c. 12

linearibus lanceolatisve acutis, hispidulis, 0·6 cm. longis; floribus radii c. 12 cyaneis ligulatis anguste oblongis glabris, involucrum duplo excedentibus, apice minute 3-dentatis, 5-nerviis, stylo filiformi brachiis filiformibus exsertis, acheniis oblongis compressis, hispidulis, pappi setis asperis; floribus disci tubulosis, 0·4 cm. longis, subcylindricis, dimidio superiore paulo ampliato, medio fere extus setis sparsis hispidulis, segmentis ovatis obtusiusculis extus setis sparsis ornatis, intus glabris; antheris anguste linearibus subacutis, vix 0·2 cm. longis, filamentis filiformibus, antheris brevioribus; stylo filiformi glabro, brachiis filiformibus antherarum apices paulo excedentibus; acheniis hispidulis compressis, pappi setis asperis corollæ æquilongis.

In regione austro-orientali: In clivis arenosis lapidosisque in cacumine montium Drakensbergen, "Mont aux Sources," alt. c. 10,000 ped., Jan. 1896; *J. Thode.*

This must be a fine plant with its large blue rays. It is allied to *F. barbata* Schltr. (*Aster barbatus* Harv.) from the south-western region of the Cape Colony, but has larger flower heads and smaller leaves with a different indument.

85. **Senecio subcoriaceus,** sp. n. Herba perennis, erecta, 25–30 cm. alta; foliis radicalibus rosulatis subcoriaceis obovatis obtusissimis, basi valde angustatis superne sparsim hispidulis, subtus glabris, 4–5 cm. longis, supra medium 2·5–3 cm. latis, margine nunc integris, nunc obscure crenulato-dentatis; caule erecto e basi adscendente dense glanduloso-puberule, parum ramoso, dimidio inferiore simplici foliis parvulis 3–4, linearibus glanduloso-puberulis ornato, ramulis paucis filiformibus erectis infra capitulum squamulis minutis laxis donatis, laxe glanduloso puberulis; involucro campanulato, 0·8 cm. diametiente, foliis 12–15 subuniseriatis linearibus acutis, margine hyalinis, c. 0·6 cm. longis, dorso sparsim hispidulis, apice breviter subbarbato-ciliatis; capitulis ad apicem ramulorum singulis, laxe subcorymbosis, discoideis; floribus tubulosis, 0·7 cm. longis, tubi dimidio inferiore cylindrico glaberrimo, dimidio superiore ampliato, segmentis ovatis, erectis, apice incrassata subincurvis; antheris anguste linearibus obtusis, 0·2 cm. longis, filamentis filiformibus glabris, antheris brevioribus; stylo filiformi glabro, brachiis apice truncatis, antherarum apices excedentibus; acheniis cylindricis glabris, apice margine ampliatis subhyalinis, quasi pappum exteriorem annularem formantibus; pappi setis tenuibus corollæ fere æquilongis.

In regione austro-orientali: In collibus prope Newcastle (Nataliæ), alt. c. 3900 ped., 17 Dec. 1895; *J. M. Wood*, No. 5980.

In the section "*Plantaginei*" our plant should rank next to *S. petiolaris* Thbg., from the Bockland, from which it is easily to be recognized by the branched stem, the leaves, and the glabrous achenes. The colour of the flowers is light yellow, often with reddish tips to the lobes. I remember having collected *S. subcoriaceus* at Volksrust, in the Transvaal, in October, 1893.

86. **Hemimeris gracilis,** sp. n. Herba annua, erecta, tenuis, simplex vel parum ramosa; caule stricto vel subflexuoso, 15–25 cm.

alto, laxe foliato, tereti, glanduloso-puberulo, foliis pro genere bene petiolatis ovatis vel ovato-ellipticis obtusis parum grosse dentatis vel crenato-dentatis, 0·7–1 cm. longis, 0·5–0·7 cm. latis, petiolo gracili 0·4–0·7 cm. longo; floribus ad apicem caulis in axillis foliorum singulis; pedicellis filiformibus glanduloso-puberulis, folia excedentibus, post anthesin elongatis, decurvis; calycis segmentis linearibus vel lineari-lanceolatis obtusis, glanduloso-puberulis, 0·3–0·4 cm. longis; corolla c. 0·5 cm. diametiente, aurea, labio posteriore anteriori multo minore, concavo, obtuso, rotundato, anteriore subquadrato obtusissimo glabro, bifossulato, calcaribus duobus divergentibus 0·5 cm. longis obtusis glabris; stylo lineari brevi, utrinque hyalino-alato, glabro, 0·1 cm. longo, stigmati latiore; capsula subglobosa glabra, calycem paulo excedente, c. 0·4 cm. diametiente, seminibus pallide brunneis subglobosis, granuloso-punctatis.

In regione austro-occidentali: In arenosis lapidosisque juxta viam magnam in valle fluminis Hex River, prope "Hex River Station," in ditione Worcester, 14 Aug. 1897; *Capt. Wolley Dod.*

At once separable from all the other species of the genus by the two distinct divergent spurs of the corolla. In habit it resembles slender specimens of *H. sabulosa* Benth. As with the flowers of the other species, they are here yellow.

On my last journey to Little Namaqualand I discovered two more spurred species of *Hemimeris*, both of which will be published shortly.

87. **Loranthus Pentheri,** sp. n. Planta habitu *L. oleifolio* Ch. et Schltd. simillima, ramulis teretiusculis laxe foliatis, elongatis, glabris; foliis oppositis vel suboppositis anguste oblongis obtusis, glabris perbreviter petiolatis, basi vulgo obliquis, 4–7 cm. longis, 1–1·5 cm. latis; umbellis paucifloribus axillaribus, pedunculo perbrevi glabro, 0·5–1 cm. longo; pedicellis glabris apice incrassatis calycem disciformem formantibus, pedunculo vulgo longioribus nunc æquilongis, c. 0·8 cm. longis; calyce obconico basi truncato, apice integerrimo, 0·6 cm. longo, basi 0·3 cm. diametiente, apice 0·6 cm. diametiente; petalis 5, usque ad basin liberis, e basi incrassata anguste linearibus tertia parte superiore paulo dilatatis, utrinque glabris, c. 5·5 cm. longis, medio fere latitudine vix 0·1 cm. excedentibus, flexuoso-recurvis, lateralibus basi obliquis; staminibus petalis æquilongis, filamentis filiformibus glabris, tertia parte inferiore petalis adnatis, antheris porrecto-incurvis angustis, obtusis, 1·4 cm. longis, basi sursum dilatata plicato-rugosis; stylo filiformi glabro, staminibus æquilongo vel parum longius; stigmate capitato.

In regione tropico-orientali: in arboribus prope Ligombwe, in terra Matabeleland, 26 Jun. 1895; *Dr. A. Penther.*

Although allied to *L. oleifolius* Cham. et Schlect., our species differs so considerably from it that no doubt about their differences can possibly arise. The flowers seem to have been purplish.

88. **Thesium Sonderianum,** sp. n. Fruticulus adscendens e basi ramosus; ramis irregulariter striatis, subteretibus, elongatis,

dense foliatis, mox lignescentibus, glabris; foliis erecto-patentibus demum vulgo falcato-recurvis, filiformi-subulatis, acutis, glabris, dorso carinaque, imprimis superioribus, minute granulato-serrulatis, 0·3–0·7 cm. longis; spicis terminalibus ovoideis cylindricisve, 1–1·8 cm. longis, c. 0·8 cm. diametientibus; bracteis foliaceis foliis latioribus lineari-lanceolatis acutis, margine pellucido tenuissime ciliolatis, florem æquantibus vel paulo brevioribus, bracteolis bracteæ similibus, paulo angustioribus brevioribusque, acute carinatis; perigonio tubuloso extus glaberrimo, 0·8 cm. longo, 0·3 cm. diametro, segmentis suberectis lanceolato-oblongis subacutis, 0·3 cm. longis, intus margine dense niveo-barbatis, basi medio fasciculo pilorum ad antheras tendentium ornatis; staminibus tubum perigonii vix excedentibus, filamentis subulatis brevibus, antheris oblongis filamento bene longioribus, 0·1 cm. longis; stylo filiformi erecto, basin antherarum paulo excedente.

In regione austro-orientali: Ad margines lapidosos planitiei, supra Grahamstown, in ditione Albany, Jul. 1865, alt. c. 2200 ped.; *P. Macowan*, No. 804.

In regione Carrooidea: In lapidosis montis "Cave Mountain," prope Graaff Reinet, alt. c. 4500 ped., Nov. 1866; *H. Bolus*, 526.

The plant collected by MacOwan has been named *T. scabrum* by Sonder, whereas Bolus considers it a variety of *T. funale* L. Neither of the two, however, can possibly be applied; our plant is quite distinct from both, but nearer allied to *T. scabrum* L. than *T. funale* L., next to the former of which I place it.

89. **Moræa macra**, sp. n. Perennis, gracilis, 20–30 cm. alta; cormo ovoideo, tunica rigida reticulata apice fissa vestito; folio radicali singulo, filiformi, glaberrimo, rigidiusculo, basi scapum arcte amplectente, vulgo flores superante; scapo glaberrimo supra basin vulgo subgenuflexo, plerumque plus minusve ramoso; bracteis exterioribus foliaceis, more generis pedicellos amplectentibus, acutis, interioribus membranaceis occultis; pedicellis filiformibus, glabris; perigonii segmentis exterioribus unguiculatis, lamina ovata subacuta, 2 cm. longis; interioribus lineari-spathulatis ungui fere æquilongis, 0·8 cm. longis; columna staminea basi connata; antheris linearibus, 0·7 cm. longis, filamentis filiformibus, antheris duplo brevioribus; ovario glaberrimo, capsula oblonga utrinque obtusa, 1–1·2 cm. longa, c. 0·5 cm. diametiente.

In regione austro-orientali: In planitiebus graminosis prope Queenstown, alt. 3600–3800 ped., Nov. 1896; *E. E. Galpin*, No. 2193.

The species is certainly allied to *M. tripetala* Ker, but at once can be easily distinguished by its ramification and the larger inner perigon-segments. The colour of the flower is said to be "lilac with yellow spots," whereas in *M. tripetala* Ker we have cyaneous flowers. The stigma appendages are rather short.

90. **Romulea longipes**, sp. n. Herba perennis, 20–45 cm. alta; cormo subgloboso, basi breviter truncato, tunica rigida, lucida basi breviter fissa vestito; foliis radicalibus (in speciminibus visis 2), filiformibus rigidis erectis, basi vaginantibus, glaberrimis, caule

elongato, erecto, filiformi glabro, apice vagina erecta, rigidiuscula e basi lanceolata filiformi ornata; floribus fide collectoris albis, breviter pedicellatis; pedicellis filiformibus, flori brevioribus; spathæ valvis æqualibus, ovato-lanceolatis acutis, membranaceo-marginatis, perigonio brevioribus; perigonio campanulato, segmentis connatis, lanceolatis acutis, utrinque glabris, 1·5–2 cm. longis, tubo dimidium perigoni vix æquante; staminibus segmentis brevioribus, filamentis angustissime linearibus, 0·7 cm. longis, glabris; antheris lineari-oblongis, apice glandula parvula ornatis, 0·4 cm. longis; stylo filiformi glabro, brachiis antheras haud excedentibus.

In regione austro-orientali: In graminosis prope Port Alfred, in ditione Bathurst, Coloniæ Capensis, alt. c. 200 ped., Nov. 1895; *E. E. Galpin*, No. 3023.

A species well distinguished from its allies by the elongate stem. The colour of the flowers, if any value may be attached to it, brings it to the neighbourhood of *R. chloroleuca* Baker, a very different stemless plant.

MYCETOZOA OF ANTIGUA.

By Arthur Lister, F.R.S.

In the number of this Journal for April, 1898, a record was given of fifty-three species of Mycetozoa obtained by Mr. William Cran from the islands of Antigua and Dominica. Examples of six additional species collected in Antigua have since been received from him, and the whole of his gatherings are now represented in the British Museum Collection. We are fortunate in obtaining fifty-nine species of these interesting organisms from a part of the world where they have been so little investigated by former naturalists. Mr. Cran has now left Antigua, and resides in Scotland; and we cannot but regret that his work in the West Indies has been brought to a close, for it was an unusual privilege to have a man with accurate discrimination living on the spot, who, besides collecting the specimens, could observe their life-history.

A striking feature in these gatherings is the entire absence of any species of *Trichia*, which is a remarkably cosmopolitan genus; but as the plasmodium almost always inhabits the substance of rotten wood, it seems probable that the rapid destruction of exogenous timber by white ants, described by Mr. Cran,* may account for his finding no species of *Trichia* in the island.

The following is a list of the new specimens:—

Physarum nucleatum Rex. On dead leaves. This species is not uncommon in the United States of America, and has also been obtained from Borneo and Java. It nearly resembles *Physarum compactum* (Wing.) List. in the character of the capillitium; but in all the specimens of *P. nucleatum* we have examined the small angular lime-knots contain strikingly large and round lime-granules, which are more loosely arranged than in *P. compactum;* these granules often fuse together, so as to form a vitreous nodule. The dense deposit of lime in the stalk and the usually well-defined spots of lime in the sporangium-wall afford the most distinct specific features of *P. compactum*, as contrasted with the absence of lime in the stalk and the crowded calcareous deposits in the sporangium-wall of *P. nucleatum.*

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* Journ. Bot. 1898, 111.

PHYSARUM INÆQUALE Peck. The specimen from Antigua, on dead wood, is the small compressed form obtained by Count Solms Laubach in Java in 1884, preserved in the Strassburg collection, and by Prof. O. Penzig in the same island in 1896.* It is closely allied to *P. virescens.*

CHONDRIODERMA RETICULATUM Rost. On dead leaves. Effused or elongate plasmodiocarps, with typical capillitium and spores.

CHONDRIODERMA RUGOSUM Rex. This Antigua gathering is represented by a number of sporangia mounted in glycerine-jelly. The capillitium is darker than described by Dr. Rex, but examination of the original type shows considerable colour in some sporangia. The stalks are longer than in the Dominica specimen (Journ. Bot. 1898, 118), and the spores measure 8–9 μ.

DIACHÆA SUBSESSILIS Peck. Mr. Cran obtained a fair supply of this species in Antigua, but it was unfortunately lost at the time of his leaving the island, with the exception of a mounting in glycerine-jelly of several sporangia. These are quite typical, the spores having precisely the same sculpture as those from Flitwick (figured in Journ. Bot. May, 1898, tab. 386, fig. 9). Further British gatherings have been secured since the first discovery in this country in Sept. 1896 (*l. c.* 1897, 213). It was found in considerable abundance by Mr. Crouch in Flitwick Wood, in October, 1897, and by Mr. Saunders in the same month at Holt, Norfolk, in Mr. Gurney's woods.

DIDYMIUM FARINACEUM Schrad. var. MINUS. There are two specimens from Antigua of this species. One is of the usual form, with dark rugose stalks. In the other the stalks are white, and densely charged with crystals of lime below the almost black columella. A gathering from Lyme Regis with half the stalk white and similarly charged with lime connects this specimen with the type, but it is a striking and instructive form. The spores measure 8 μ.

DIDYMIUM NIGRIPES Fr. var. α. On dead leaf. This is a typical specimen with the dark columella. That recorded from Antigua in the former notice was var. γ *xanthopus* with a white columella.

COMATRICHA OBTUSATA Preuss. On dead wood. A small form with globose sporangium, and slender capillitium forming a loose superficial net. Spores nearly smooth, 7 μ diam.

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* *Die Myxomyceten der Flora von Buitenzorg*, Dr. Penzig, Leiden, 1898, p. 34.

NOTES ON THE FLORA OF SHROPSHIRE.

By Arthur Bennett, F.L.S.

I learn from *Science Gossip* that the members of the Caradoc and Severn Valley Field Club are engaged upon a new Shropshire Flora, and that Mr. W. P. Hamilton, of Shrewsbury, will be glad to receive records or other information. The late Mr. Beckwith, of Ironbridge, had hoped to have brought out a flora of the county and sent me many specimens, and we had much correspondence on the subject. It is for that reason that I make a few observations on some plants of the county; if any reader of this Journal can supply any information, I trust they will send it to Mr. Hamilton.

Elatine hexandra DC. (Leighton's *Flora*, 173). I have this from "Mere near Ellesmere, 1871, Fred. Stratton," and also received it from Mr. Beckwith.

Salix pratensis L. (*Flora*, 504). Mr. Watson places Shropshire among doubtful counties for this plant, and thinks *S. Verbenaca* may have been mistaken for it; but Mr. Leighton put a "!" to one locality, and he was too good a botanist not to distinguish the two. In one of the localities the plant may have been an introduction, but in the other, "Oakley Park, near Ludlow," it may be native.

Actinocarpus Damasonium Br. (*Flora*, 157). A western locality for an eastern species in Britain; the Cornish one seems to have been an error. It was "abundant at Ellesmere Mere"; a specimen thence is in the British Museum Herbarium, gathered by H. Bidwell in 1843. This seems a decreasing species in Britain.

Alisma natans L. (*Flora*, 158). I have received the true plant from Mr. Beckwith. This seems to require confirmation from several counties; I have it from Salop, Montgomery, Carnarvon, Chester, and have seen it from Anglesea. In addition to those named in Top. Bot. ed. 2, it is reported from Cardigan in this Journal for 1864, p. 8.

Scheuchzeria palustris L. This seems to be one of our decreasing species, and I have noted the dates, so far as my material will allow, of the various counties for which this species is reported. In Salop it was discovered in 1824 by Mr. J. Jendwine; it was also gathered in 1831 by Prof. Babington; both of these gathered it at Bomere, and Mr. Jendwine also at Shomere. In 1866 the Rev. O. M. Fielden found three specimens on Welsh Hampton Moss.* In June, 1884, Mr. Beckwith found it at Ellesmere. In 1892 the Rev. E. F. Linton told me that he had searched unsuccessfully for it both at Bomere and Ellesmere, and remarked that Mr. Phillips thought it was extinct at Bomere: the latest specimen I possess from Bomere is July, 1870. There is some discrepancy as to its first discovery in England. In this Journal (*l. c.*) Mr. Leighton says it was first found in Lakeby Car, near Boroughbridge, York, by the Rev. J. Dalton in 1787, and figured in Eng. Bot. t. 1801, in 1807. But on Sowerby's drawing at the British Museum the date of its finding is given as "1807." I have been unable to discover on what Mr. Leighton based his statement, but on an original specimen in the Yorkshire Philosophical Museum Herbarium the label has "Lakeby Carr, Boro-Bridge, 1. 6. 1807. Rev. James Dalton"; but unfortunately this was transcribed by the Rev. W. Hincks, and the original label is wanting. The latest specimen I have hence is from Mr. G. Webster, 1871. Dr. Lees, in his *West Yorkshire Flora*, gives the date of its discovery on Thorne Moor, near Doncaster, Yorkshire, as "S. Appleby, 1832, in Mag. Nat. Hist. v. 558," and says that, in company with Mr. W. Todd, he found one specimen "by a well" in 1870. In the British Museum there are specimens from "Thorne Moors," from Mrs. Robinson's herb., 1847. In 1833 Mr. Duff[*] discovered it in the White Myre of Methven, generally called Methven Bog. In this locality (Journ. Bot. 1884, 274; 1889, 363; Flora of Perthshire, 306) Dr. Buchanan White says it is probably extinct—probably in consequence of the settlement there of "a colony of about three thousand black-headed gulls." But another cause may have helped its extinction, for Mr. John Sim says (Phytol. ii. 576 (1858)) that he gathered above three hundred plants there: "it is nearly done"! I have specimens gathered by Mr. Sim in this locality, gathered "June–Aug. 1860," in flower and fruit; it is last known to have been gathered there by Sim in 1874. In 1849 the Rev. G. Pinder found it in Wynbury Bog, Cheshire;[†] Mr. Watson says that the Rev. M. J. Berkeley had sent him a note of it from the "north of Notts": I have no recent knowledge of the species from either of these counties.

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* Journ. Bot. 1866, 306.

Rynchospora fusca Sm. is recorded from Bomere Pool in Leighton's *Flora* (p. 36), on the authority of the Rev. E. Williams; unfortunately the specimens (if such) could not be traced, and Mr. Leighton says he searched for it in vain. From the geographical standpoint there is no reason why it may not have occurred.

Carex extensa Good. (*Flora*, 458). Watson excluded this as from an inland county; and Mr. Leighton does not put the sign "!" after the locality, but remarks: "The form of the nut, independently of any other differences, essentially distinguishes this from every modification of *flava*." Could this have been *C. Mairii* Coss. & Germ. (Obs. Pl. Crit. 18, t. 1 et 2, 1840)?

Mr. Leighton did not include the *Characeæ* in his *Flora*. Among a quantity of submerged material from a pool in Salop, sent me by Mr. Beckwith, I found some small scraps of *Chara gracilis*.

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[*] Hooker, Brit. Flora, 176 (1835).

[†] H. C. Watson, Cyb. Brit. ii. 480.

CRITICAL NOTES ON SOME SPECIES OF *CERASTIUM*.

By Frederic N. Williams, F.L.S.

(Continued from p. 344.)

14. C. ambiguum Fisch. in litt. ex Ser. in DC. Prodr. i. 419. This plant has never been described. Fischer appears to have sent specimens to Seringe, who referred them to *C. strictum* var. *commune*. In Herb. Kew. there is a specimen apparently authenticated under this name proposed by Fischer, which was collected by Turczaninow in 1830. It is labelled "in siccis ad Angaram": which I presume to refer to the River Angara, in the Siberian province of Irkutzk. It consists of a single flowering stem 15 centim. long, with basal leaves attached. From the number of leaves attached to the base of this single stem, it may be inferred that the plant is more than usually cæspitose. The stem is almost glabrous, and the leaves are provided with a few short hairs of a non-glandular character. The dichasium has six flowers somewhat smaller than those in typical specimens of *C. arvense*, supported on pedicels rather shorter than the calyx. There are no capsules on the specimen, but, as the ovary is very short, probably the capsule would be short as in *C. arvense*. The brief diagnosis which follows serves to indicate the characters which distinguish it from normal forms of the species:—

C. arvense var. ambiguum Williams.—Plusminus cæspitosum, subglabratum vel parce puberulum, eglandulosum, clarescenti-viridulum, 15 centim. Folia basilaria approximata, caulina remota. Dichasium 6-florum; flores breviter pedicellati; pedicelli floriferi calyce paullum breviores, fructiferi haud visi (longiores?); bracteæ lanceolato-lineares. Ovarium ovale.

Hab. Siberia; in dry places near the River Angara, in the province of Irkutzk, long. 103° (*Turczaninow*).

15. C. amblyodontum Colenso, in Trans. New Zeal. Instit. xxvii. 384 (1894). So named from the structure of the capsular teeth. Not very different from the same botanist's *C. truncatulum*. Judging from the specimens in Herb. Kew., it seems to belong to the *C. pumilum* group of species.

16. C. amplexicaule Sims, Bot. Mag. t. 1789 (1816) = *C. davuricum* Fisch. (1815).—Sims's plant is not referred to by Ledebour (Fl. Ross. i.); but both authors cite the same figure in J. G. Gmelin's Fl. Sibirica, iv. 148, t. 62, f. 1 (1769), where it is described under the name of "Alsine Cerastium foliis connatis." The leaves are connate at the base rather than amplexicaul, as the figure shows distinctly, so that the name of *C. connatum* for the plant proposed by S. G. Gmelin in the second volume of his *Reise durch Russland* (1774–1783) is a better one, and is the name attached to the specimens in Willdenow's herbarium, no. 9055. *C. amplexicaule* was raised in Lambert's garden at Boyton, in Wiltshire, from seeds sent by Fischer from the Botanic Garden at Gorenki, near Moscow. Sims in the course of his description says that in Gmelin's figure

the peduncle of the fruit is upright, as distinguished from his specimens in which the peduncle is bent downwards at its junction with the stem. This is probably due to the æsthetic sense of symmetry evinced by the draughtsman, who forbore to represent the central peduncle as crooked while the alar peduncles were straight.

17. C. ANDINUM Benth. Plant. Hartweg. 162 (1839–57) = *C. mollissimum* Poir. In the *Index Kewensis* the habitat of this plant is stated to be the republic of Colombia, but I find that Hartweg's specimens (no. 907) were from Mt. Antisana, in the Andes of Ecuador. These specimens differ from those of typical *C. mollissimum* in the sepals being thickly covered with woolly hairs.

18. C. ANDINUM Peyritsch, in *Linnæa*, xxx. 59 (1860), [= *C. molle* Bartl.].

Hab. Mexico; volcano of Toluca, at 4100 metres.

19. C. ANDINUM Phil. in Anal. Univ. Chil. (1862) ii. 318, et in Linnæa, xxxiii. 21 (1864) = *C. triviale* var. *andinum* Williams. Nanum condensatum vix glandulosum; folia oblongo-linearia; petala calyce paullo breviora.—The specimens are not to be distinguished from those of *C. vulgatum* var. *andinum* (A. Gray, in U. S. Explor. Exped. Bot. i. 120).

20. C. ANDROSACEUM Ser. in DC. Prodr. i. 416 (1824) = *C. Illyricum* Ard. (1763–64). Seringe founded the species (so named from its superficial resemblance to *Androsace villosa*) on Castagne's specimens from the neighbourhood of Constantinople. In Noë's herbarium in the Nancy Museum there are specimens from the same locality labelled "Constantinople, 1844, n. 148," which exactly agree with Castagne's specimens. It may be noted that Boissier cites this same number in the same series of plants for *Delphinium persicum* var. *assyriacum* Boiss. Seringe's somewhat meagre description is—"pusillum pilosissimum, foliis ovatis, caule dichotomo, floribus subcapitatis ternis, pedunculatis basi involucratis, sepalis angustis acutissimis." The specimens which Castagne sent to Seringe were labelled "*Cerastium pilosum.*" Castagne probably compared them with the description and plate in the *Flora Græca* (t. 454), which, however, undoubtedly refer to *C. Illyricum.* True *C. pilosum* is a Siberian plant.

21. C. ANGUSTIFOLIUM Vitm. Summa Plant. iii. 137 (1789) = *C. strictum* L. Sp. Plant. 439 (1753); *C. arvense* L. *β. strictum* Lec. & Lamot. Cat. Pl. Vasc. Centr. France, 108 (1847).

Syn. *Centunculus augustifolius* Scop. Fl. Carniolica, ed. 2, 322, t. 19 (1772).
C. rigidus Scop. *l. c.*
Cerastium serpyllifolium W. Enum. hort. Berolin. suppl. 26.
C. mutabile var. *strictum* Gren. Monogr. 69.
C. arvense var. *alpicolum* Fenzl in Ledeb. Fl. Rossica, i. 413.

Centunculus is one of Adanson's genera, taken up by Scopoli, who describes five species, all referable to *Cerastium.* The pre-Linnean synonyms for this plant cited by Scopoli are—

Caryophyllus holosteus alpinus gramineus, Bauhin, Prodr. 104 (1671).

Myosotis caule hirsuto, foliis perangustis glabris, flore calycem excedente, Haller, Enum. pl. Helv. 384, t. 5, f. 1.

Both these names are mentioned by Linnæus under *Cerastium strictum*, so that there can be no doubt about the identity of the plant. Vitman's description is so much more lucid than that of Linnæus that I here transcribe it:—"Caules digitales foliosi, floriferi. Folia lineari-lanceolata, mollia. Calyx laciniis carinatis, acuminatis, villosis. Petala non profunde bifida, calyce longiora. Capsula calyce brevior, 10-valvis." Linnæus, however, says of the leaves: "folia linearia, acuminatissima, stricta, glabra," and bases the "nomen triviale" on this character. This discrepancy is probably due to the fact that the difference between the radical and cauline leaves is not noted: the cauline leaves (in Austrian specimens) are oblong or lanceolate, the radical leaves much narrower and recurved somewhat, resembling those of *C. alpinum*.

22. C. ANOMALUM Waldst. & Kit. ex W. Sp. Plant. ii. 812 (1799); et Pl. rar. Hung. i. 21, t. 22 (1802). At the time when Willdenow was occupied in re-editing Linnæus's *Species Plantarum* and bringing it up to date, Kitaibel was engaged on his monumental work, and knowing probably that Willdenow was about to publish the new edition, he communicated to him the description of this Hungarian plant. The authority as given by Willdenow is "Waldstein et Kitaibel, Pl. rar. Hung." On the other hand, when this latter work was subsequently published, the reference to Willdenow was full and explicit. There is therefore no ambiguity about the date. The species is widely distributed, and occurs in Europe, Asia, and N. Africa, growing on damp pastures.

Geogr. limits:—N.: Germany; on the banks of the Oder at Steinau, in the province of Silesia. S.: Syria; between Tripoli and Hamah (Blanche ex Boiss. Fl. Orient. i. 715). E.: Russian Turkestan; east shore of the Caspian Sea (Karelin ex Ledeb. Fl. Rossica, i. 398). W.: France; dept. of Loire-inférieure (Rouy et Fouc. Fl. de France, iii. 225).

23. C. APETALUM Dumort. Obs. Bot. 47 (1822) = *C. glomeratum* var. *apetalum* Rouy & Fouc. Fl. de France, iii. 213 (*C. viscosum* var. *apetalum* Fenzl). If the rule of priority in names were as generally applicable to varieties as it is to species, the name of this plant should be *C. glomeratum* var. *rotundifolium*, as Dumortier's plant (which is not mentioned in Grenier's monograph) is identical with *C. rotundifolium* Fisch. (1812). This, however, would not be such an appropriate name. The flowers are usually apetalous, though the uppermost flowers on the stem bear sometimes 2–4 small petals. I have seen specimens from Thirsk, in Yorkshire. Dumortier's work is usually wrongly cited as "Comm. Bot.," *e.g.* in *Index Kewensis*.

24. C. APRICUM Schlechtendal in Linnæa, xii. 208 (1838): = *C. nutans* var. *apricum* Rohrb. in Linnæa, xxxvii. 290 (1872–73). Pedicelli crassi; calyx 4 mm.; petala calycem æquantia. Variat

foliis angustioribus longioribus et latioribus magisque spathulatis ac tum capsulis subbrevioribus. Semina dorso leviter sulcata, faciebus leviter depressa.

The specimens I examined were Liebmann's Pl. Mexic. n. 1, collected in the Chinantla district of prov. of Puebla in May, 1841. The type-specimens were collected by Schiede at San Salvador, near Jalapa, in the prov. of Vera Cruz. Liebmann's specimens are 20–22 centim. high, and a medium-sized capsule contained thirty-five seeds. By Grenier (Monogr. Cerast. 83) placed among the doubtful and obscure species. In the original description Schlechtendal says: "habitu ad *C. vulgatum* (seu *triviale*) accedit sed folia longiora angustiora, inflorescentia laxior, attamen ut jam prius diximus affine quoque *C. nutanti* Americæ septentrionalis." This earlier reference to the plant is in Linnæa, v. 233 (1830). Specimens were subsequently distributed under the name of *C. mexicanum* by Schaffner, Coll. Pl. Mexic. n. 301.

25. C. Apuanum Parl. in Nuov. Giorn. Bot. vii. 69 (1875). Parlatore says: "immerito ab auctoribus cum *C. alpino* Linn. quod ab Apenninis omnino exul, et *C. arvensi* Linn., a quibus satis differt, confusum." By Nyman the plant is placed under *C. Thomasii*.

Syn. *C. alpinum* Bertol. Fl. Alp. Apuan. in Amœn. Ital. 368, et Fl. Italica, iv. 762 (as to the plant from the Apuan Alps).

Hab. Italy; several localities in the Apuan Alps, in the prov. of Massa-Carrara.

26. C. arabicum Fisch. & Mey. ex Heynh. Nomencl. Bot. ii. 133 (1840). I can find nothing about this plant. It is mentioned neither by Fresenius (Beitr. fl. Ægypt. Arab.) nor by Deflers (Voyage au Yemen). From the character of the work in which it occurs, it may be only a garden form.

27. C. Arabidis E. Mey. ex Fenzl in Ann. Wien. Mus. i. 340 (1836); Harv. & Sond. Fl. Capensis, i. 130 (1858). A species founded on Drege's specimens n. 3557, collected at 2200–2400 metres on the Witte-berg, in Cape Colony. So named by Meyer from its lanceolate leaves resembling those of *Arabis hirsuta*. Sonder describes a "var. *glutinosum*" from Tambu-land, which is scarcely more than a form with somewhat weaker stems covered with short glandular hairs, instead of with long hairs towards the base as in the type. The species is also recorded from Queenstown District (*Cole*, 1860, *Cooper*, n. 393); Mt. Currie, in Griqualand East, at 1600 metres (*Tyson*, 1883, n. 1365); and Faku's territory (*Sutherland*, 1864). All these specimens match those collected by Drege.

28. C. Araraticum Rupr. Fl. Caucasi, 234 (1869) = *C. alpinum* var. *Araraticum* Williams.—Ruprecht says that this plant is nearest *C. gnaphalodes*, from which it differs in "foliis turionum radicalium non fasciculiferis, apice haud congestis subrosulatis, oblongo-linearibus, similibus caulinis, nec rotundato-spathulatis heteromorphis, sepalis sæpe minoribus, vix ultra 6 mm., petalis calyce duplo majoribus." In the seeds, however, the nucellus is closely invested with the testa, as in all forms of *C. alpinum*. In Moritz's

specimens the flowering stems are 5–10 centim. high, with short linear-lanceolate leaves, and terminating in few-flowered dichasia. The specimens collected on Mt. Ararat at 3050 metres seem to be identical with those of Kotschy (It. Cilicico-Kurd. 1859, n. 524) from Bitlis, in the vilayet of Musch, referred to *C. gnaphalodes* (Boiss. Fl. Orient. i. 728), and with those of Aucher-Eloy from Mt. Athos, in Rumelia (Herb. d'Orient, n. 624), which were referred to *C. grandiflorum* by Boissier, and to *C. arvense* by Grisebach. This variety of *C. alpinum* seems, therefore, to have a wide range.

29. C. ARCTICUM Lange in Fl. Danica, t. 2963; et in Overs. Vid. Selsk. Forh. 119 (1880). From an examination of authentic specimens, I believe this to be an hybrid between two forms of *C. alpinum*. At Am Binnein, in Perthshire, the plant is associated as on Ben Lawers with forms of *C. alpinum*. In Greenland and Lapland, and wherever else the plant has been found, one or other of the forms of *C. alpinum* occurs, and intermediate and connecting forms are frequent. Mr. N. A. Svensson collected specimens in the Lapmark district of Northern Sweden, which he considers hybrid between *C. alpinum* var. *glabrum* and *C. arcticum*. *C. arcticum* var. *Edmonstonei* is another obscure form from Unst, one of the Shetland islands. Mr. J. M. Norman records connecting forms from the island of East Vågoen and from Finmark, in Arctic Norway; though in a letter I recently received from him he expresses uncertainty as to the status of *C. arcticum*. In his lucid notes on the flora of Arctic Norway he writes: "non dubito, quin proles hybrida sit, etsi una parentum, *Cerastium latifolium*, in tractu natali ejus hactenus non inventa est, tamen in districtu vicino Ofoten proveniens." The form has been found as far south as Caernarvonshire.

30. C. ARENARIUM Tenore, Fl. Napolitana, iv. 232 (1830). I have examined the authentic specimens in Gay's herbarium which were sent to him by Tenore, who collected them at Castellamare, to the south of Naples. The plant has been so shuttlecocked from one species to another, that I have here described it from these specimens as if they represented the type of a species, though I believe it should be united with *C. pellucidum* (1821). Whether the latter be considered as a variety or as a species, it should certainly be placed in the same small group with *C. semidecandrum*.

Radix annua, fibrillosa. Caules erecti basi conferti, cum ramis diffusis adscendentes, villoso-hirsuti, virescentes, glanduloso-viscosi aliquando autem non viscosi, crassiores quam in *C. semidecandro*, in dichasium laxum soluti. Folia basilaria spathulata petiolata, superiora ovale-lanceolata vel late linearia. Dichasium multoties dichotomum; pedicelli inferiores calyce 2½–4-plo longiores (in descriptione originali Tenore "piu corti" scripsit, *i.e.* paullum breviores); flores micropetali; bracteæ late scariosæ oblongo-lineares acuminatæ. Sepala lanceolata acuta, interiora paullo angustiora. Petala emarginato-biloba calyce breviora, unguibus glabris. Stamina 5; filamenta glabra. Capsula ovato-cylindrica, apice leviter incurvata, calyce duplo longior. Semina rufescentia, faciebus depressa, dorso sulcata.—Planta 12 centim. vel plus minus ultrà, tota pilis transversis villoso-hirsutis obsita.

Tenore says that his plant is very near *C. obscurum* Chaub., "sed folia in nostro obovata nec lanceolato-oblonga, et pedunculi breviores." Both *C. obscurum* and *C. pellucidum* are accorded specific rank in St. Amans' Fl. Agenaise. The plant is certainly identical with *C. semidecandrum* (vix Linn.) Desf. Fl. Atlantica, i. 306 (1798). *C. arenarium* is kept up as a species by Lojacono (Fl. Sicula, 179), specimens being recorded from Mt. Etna and Catania. *C. semidecandrum* var. *arenarium* Willk. & Lange, Prodr. fl. Hisp. iii. 632, is quite a different plant—"petalis minimis (non nisi sub lente conspicuis), sæpe circacircum denticulatis."

31. C. ARENOSUM Kit. Addit. fl. Hung. in *Linnæa*, xxxii. 518 (1863). So named by Kitaibel from the specimens occurring in "graminosis arenosis." This very doubtful plant cannot stand as a species or even as a problematical variety. The enigmatical diagnosis is—"descriptum sub nom. *C. ovalis*, a quo vero secundum descriptionem Smithii, cui hoc *C. vulgatum* est, differt. Proximum *C. viscoso*, a quo distinguendum."

32. C. ARGÆUM Boiss, & Bal. Diagn. Pl. Or. nov. Ser. ii. vi. 38 (1859); Boiss. Fl. Orient. i. 715.

α. *typicum* mihi. Tota planta pubescenti-viscida.

β. *glabratum* Haussk. ined. in exs. Sintenis, It. Orient. 1894, n. 6089. Tota planta glabrata.

Hab. Gumuchkhané, in prov. of Trebizond.

Species facie *C. Kazbek*, hujusdem foliis oblongo-spathulatis, petalis semi-bifidis et stylis 5, distincti.

The teeth of the capsule are circinate-convolute, and not revolute at the margins: I have therefore transferred the species from the subgenus *Dichodon* to the subgenus *Strephodon*.

33. C. ARGENTINUM Williams.—Syn. *C. nutans* var. *Argentinum* Pax in Engl. Jahrb. xviii. 25 (1893). A typo *C. nutantis* toto cœlo differt,—planta 50 centim. alta, radice perenni, caulibus ramosis, foliis oblongo-lanceolatis obtusis, potius *C. crassipedi* Bartl. affinis.

34. C. ARMENIACUM Gren. Monogr. Cerast. 19, t. 1 (1841); Fenzl in Ledeb. Fl. Rossica, i. 400 (1842); Boiss. Fl. Orient. i. 719.

Type-specimens, Aucher-Eloy, Herb. d'Orient, n. 614, in Herb. DC., at Geneva.

Hab. Turkish Armenia; at Haho and Gumuchkhané, in prov. of Trebizond. Though included by Ledebour, it is not a species of the Russian flora, and does not occur in Russian Armenia.

The plant is distinguished from all the other species of the subgenus *Strephodon* by its remarkably curved capsule, which is more than half exserted from the calyx. Grenier says of the calyx, "sepala anguste scariosa," but Boissier states "sepalis late scariosis." An examination of the type-specimens shows that the former character applies to the outer sepals, and the latter to the overlapped sepals.

(To be continued.)

THE FLOWERING PLANTS OF NOVAYA ZEMLYA, Etc.

By Colonel H. W. Feilden.

This paper gives the botanical results of two visits to Novaya Zemlya and adjacent regions during the summers of 1895 and 1897. During the summer of 1895 I passed ten days on Novaya Zemlya; my investigations that season were confined to the shores and islands of Kostin Shar, and on the mainland around Rogatchiva Bay, Neckwatova, and South Goose Land. The excursion of 1897 was on a more extended scale. Dolgoi Island, a very inaccessible spot, and, as far as I know, not hitherto botanized over, was visited. More than a fortnight was passed on the island of Waigats; its northern, southern, and eastern areas were examined. The neighbourhood of Habarova, on the Russian mainland of the Yugor Straits, received some attention. In Novaya Zemlya proper, South Goose Land was revisited; Besemannya or Nameless Bay on its western coast was examined; the Matyushin Shar separating Novaya Zemlya from the North Island, or Lutke Land, was traversed; considerable botanical collections were made from various stations on both sides of that strait, and finally, favoured by an exceptional open ice-season, the Kara Sea was entered, and the eastern shores of Lutke Land examined as far north as the Pachtussow Islands.

To save repetition of latitudes in the notes that accompany this paper, I give the parallels of the different stations where botanical collections were made. It may be borne in mind that several days were passed at many of these stations, and the surrounding country botanized over: so that the latitudes given are not absolutely correct, but are intended to convey only an approximation of the localities from whence collections were derived:—

Dolgoi Island	N. lat.	69° 15′
Habarova	,,	69° 40′
South shores of Waigats	,,	69° 40′
Cape Greben ,, ...	,,	69° 41′
Cape Matiusela ,, ...	,,	70° 7′
Dolga Bay ,, ...	,,	70° 15′
Cape Voronoff ,, ...	,,	70° 20′
Islands in Kostin Shar . . .	,,	71° 15′
Neckwatova	,,	71° 15′
Rogatchiva Bay	,,	71° 24′
Beluga Bay, South Goose Land .	,,	71° 30′
South Goose Land	,,	71° 30′
Besemannya Bay (Nameless Bay) .	,,	72° 55′
Cairn Harbour (Pomorsky Bay) .	,,	73° 15′
Farassowa Valley, Matyushin Shar .	,,	73° 11′
Gubina Bay ,, .	,,	73° 12′
Beluga Bay, Lutke Land . . .	,,	73° 15′
Silver Bay ,, ...	,,	73° 25′
Pachtussow Islands . . .	,,	74° 24′
Ziwolka Fiord	,,	74° 25′

The botanical literature relating to Novaya Zemlya, Waigats, and the shores of Yugor Straits is extensive. It commences with the researches of the celebrated Von Baer in 1837, and has been continued by many eminent botanists to the present time. Few arctic lands have received greater attention from distinguished botanists than Novaya Zemlya. We may, I think, conclude that our knowledge of the species that compose its phanerogamic vegetation is practically complete. Further investigations may add a few species to the list, and will of course increase our acquaintance with the geographical range of species in the North Island.

It is, however, tolerably well accepted that the arctic flora is divided into three groups—Asiatic, European, and American—that differ slightly from one another, and the limits of these groups are well known. There is, however, a point in connection with the dispersal and spread of these groups over the polar area deserving of consideration, and one which I shall refer to subsequently in greater detail. Is the generally accepted assumption correct that during the so-called glacial epoch an ice-cap over the polar area obliterated phanerogamic and all other vegetation, and that the entire present polar flora is due to subsequent immigration from the south? It appears to me that there is evidence at our command which may induce us to pause before accepting this theory as an unquestionable fact, and there certainly are peculiarities in the distribution of the existing polar flora that point to the survival and subsequent extension of what may be called a palæarctic flora. The already recorded species of phanerogamic plants and vascular cryptogams from Novaya Zemlya and Waigats amount to about 200; my collections of 1895 and 1897 embrace about five-sixths of that flora. Of these only seven are additions; they are—

Ranunculus auricomus L.
Alsine imbricata C. A. M.
Potentilla nivea L.
Gentiana tenella Fr.
Empetrum nigrum L.
Veratrum album L.
Koeleria cristata Gaud.

I have included in this paper a series of field notes, giving some information in regard to distribution, relative abundance, and other particulars about the various plants met with, and also a brief sketch of the topographical features of the different islands and places visited.

It is my pleasant duty to render sincere thanks to several distinguished botanists for the assistance given me in identifying my arctic collections of 1895 and 1897, which amounted to several thousand specimens. Especially to Professor Eugene Warming, and Mr. O. Gelert, of the Royal Botanical Museum, Copenhagen; to Mr. Theodor Holm, the botanist to the Danish "Dijmphna" Expedition; to Mr. Arthur Bennett, Mr. H. D. Geldart, and to Mr. H. Chichester Hart, my colleague in the British Polar Expedition of 1875–76; to the members of the staff of the Department of Botany, British Museum, and of the Kew Herbarium, especially to Mr. I. H. Burkill, who examined the whole of my plants.

DOLGOI ISLAND

Lies between 69° 4′ and 69° 20′ N. lat.; it is about seventeen miles in length from north to south, and in width from a mile and a half to two miles. It is five miles due north from Cape Medinsky Zavarot, of the mainland of Russia. The island is flat, the greatest elevation not rising more than fifty feet above the sea. The rock exposures, which are visible all round the shores of the island, consist of finely crystalline, hard unfossiliferous dolomitic limestones, probably of palæozoic age. The surface is covered with marine boreal deposits; in many parts these are overlain by modern peat deposits, and a network of shallow lakes and meres occupies at least one-half of the island, which, viewed from the sea, looks like a piece of the adjoining mainland tundra surrounded by the ocean.

The proofs of recent emergence are strikingly apparent, and the natural surmise is that we should find the flora of the island simply an extension of that of the neighbouring mainland. An examination of its flora shows this to be the case, for, out of seventy-three phanerogams and two vascular cryptogams found on the island, all but one, *Tofieldia palustris*, are recorded from the shores of Yugor Straits, or the great tundra of the Samoyeds, in Eastern Europe. The most striking characteristic of the flora of Dolgoi Island is the abundance of two species of *Ericaceæ*, namely, *Cassiopeia tetragona* and *Andromeda Polifolia*, and likewise of *Empetrum nigrum*.

In a hasty examination, extending over a few hours, of an island as large as Dolgoi, the list of its plants cannot have been exhausted; but there is no reason to suppose that future investigation will alter the conclusion here arrived at, that the flora of Dolgoi Island is a reduced representation of that of the adjacent mainland.

The following is a list of the plants obtained on Dolgoi Island, 20th July, 1897:—

Ranunculus Pallasii Schl.
R. sulphureus Sol.
R. hyperboreus Roth, f. *Samoyedorum* Rupn.
Caltha palustris L.
Papaver nudicaule L.
Cardamine pratensis L.
Eutrema Edwardsii R. Br.
Cochlearia fenestrata R. Br.
Draba alpina L.
D. Fladnizensis Wulf.
D. repens Bieb.
Silene acaulis L.
Stellaria humifusa Rottb.
S. longipes Goldie.
Cerastium alpinum L. f. *hirsutum* Koch.
Arenaria ciliata L.
Hedysarum obscurum L.
Rubus Chamæmorus L.
Comarum palustre L.
Dryas octopetala L.
Hippuris vulgaris L.
Saxifraga oppositifolia L.
S. Hirculus L.
S. aizoides L.
S. comosa Poir.
S. cæspitosa L. f. *decipiens* Ehrh.
S. cernua L.
S. hieraciifolia Wald. & Kit.
Chrysosplenium alternifolium L.
Parnassia palustris L. f. *alpina* Drude.
Sedum Rhodiola DC.
Epilobium palustre L.
Valeriana capitata Pall.

Senecio campestris DC. var. *integrifolia* Hook.
Petasites frigida Fries.
Cassiopeia tetragona L.
Andromeda Polifolia L.
Vaccinium Vitis-idæa L. f. *pumila* Horn.
Primula stricta Horn.
Armeria sibirica Turcz.
Polemonium cæruleum L. f. *acutifolia* Willd.
Myosotis alpestris Koch.
Gentiana tenella Fr.
Pedicularis sudetica Willd.
P. lapponica L. [Kjellm.
Plantago maritima L. f. *pumila*
Polygonum Bistorta L.
P. viviparum L.
Empetrum nigrum L.
Betula nana L.
Salix Myrsinites L.
S. arctica Pall.
S. rotundifolia Trautv.
S. reticulata L.
Tofieldia palustris Huds.
Allium sibiricum L.
Juncus biglumis L.
Luzula Wahlenbergii Rupr.
L. arctica Blytt.
Eriophorum Scheuchzeri Hoppe.
E. callithrix Cham.
E. russeolum Fr.
E. angustifolium Roth.
Carex rariflora Sm.
C. rigida Good.
C. fuliginosa Schk.
C. glareosa Wahlenb.
C. rotundata Wahlenb.
Dupontia Fischeri R. Br.
Arctophila fulva Nym.
Poa alpina L.
P. cenisia All.
Deschampsia cæspitosa Beauv. f. *brevifolia* Trautv.
Equisetum arvense L.
Lycopodium Selago L.

WAIGATS.

This island, which is separated by the narrow Straits of Yugor from the mainland of Arctic Russia, lies between the parallels of 69° 40′ and 70° 25′ N. lat. It is about sixty miles in length and about twenty in width. The southern end of the island is generally low and swampy, the knolls and eminences rising not more than fifty feet above the level of the sea. Looking at it from the Yugor Straits, it appears as a reflection of the opposite mainland. A few miles inland, from its southern end, the country becomes hilly, and when we examine its topographical features with more care we find that these hills associate themselves into series of ridges, with a general trend from north-west to south-east, and running parallel to one another. These ridges do not anywhere exceed a height of 300 ft., as a rule they are considerably lower, and, roughly speaking, average from 70 to 100 ft.

The rock formations of Waigats consist chiefly of slates, shales, limestones, and dolomitic limestones; all have undergone great upheaval and subsequent denudation. They are nearly vertical, and their strike is from north-west to south-east. Consequently the ridges are formed by the lines of strike, and run in the same direction. The troughs or valleys between the ridges, and all the level or tundra land, are covered with a thick layer of marine boreal clay containing the shells of mollusca now occurring abundantly in the surrounding sea. Everywhere around we can trace the proofs of recent emergence from the ocean. The present island of Waigats is, geologically, an upheaval of yesterday. This clay deposit in the valleys and troughs is dotted over with meres and lakes. Many of these are surrounded with peaty growths. Waigats has no glaciers, and no attempt indeed at any permanent snow deposit. In June and July, as I saw it, the snow had generally disappeared, and only remained in scattered patches on northern slopes or in hollows; it was then difficult to realize what severe winter conditions obtain there. Thus we have in Waigats three distinct areas for the growth of plants—the disintegrated rock ridges, the predominant marine boreal clay, and the more local peat formations resting on the clay. To each of these areas certain plants appear to be restricted, whilst others are spread broadcast. Later on, under the heading of the various species obtained, are remarks as to the localities they chiefly affect. There are no trees, in the ordinary acceptance of the word, growing on Waigats, but several species of *Salix* are abundant; they are, however, only stunted bushes, not growing higher than a foot to a foot and a half. *Betula nana* appears as a procumbent plant. Viewed in summer, the surface of Waigats does not present an extreme boreal aspect. There is a good carpeting over the valleys and flats of *Gramineæ*, *Juncaceæ*, Carices, and Mosses, which gives a verdant colouring to the landscape. In some spots bright flowering plants are met with in great profusion, so that Waigats does not by any means give the impression of a bleak sterile arctic land, but rather of one where domesticated reindeer might thrive and multiply.

Novaya Zemlya and Lutke Land.

Viewed from seaward, the southern and south-western portions of Novaya Zemlya, though rising in parts to a considerably greater altitude than Waigats, present a gloomy and uninteresting appearance. In summer the snow is removed from the mountains, only remaining in patches, and there are no glaciers or mer-de-glace. The flat island of Meshdusharsky and low-lying Goose Land extend as wide breadths of tundra between the inland ranges and the sea, so that the mountains of the interior, probably some 2000 ft. high in that latitude, are dwarfed by distance. The flora of Goose Land has the same general character as that of Waigats, but one speedily realizes that it is far poorer. We notice a great falling off in the number of *Compositæ;* especially *Senecio campestris* and *S. frigidus*, which brighten the peaty land of Waigats; *Rubus Chamæmorus*, which in Waigats covers acres with large white blossoms, is there dwarfed and stunted; *Androsace Chamæjasme*, which speckles leagues of Waigats with its small flowers, is absent; and *Primula farinosa*, so abundant in that island, is hardly met with in Goose Land; whilst *Lloydia serotina* and *Allium sibiricum*, conspicuous plants of Waigats, seem altogether absent from Novaya Zemlya. As we proceed northward the mountains increase in height, until in the neighbourhood of the Matyushin Shar the ranges of Novaya Zemlya rise in series of bold and lofty peaks, snow-clad, and entwined by glaciers. Phanerogamic vegetation in that alpine region is consequently restricted to the shore line, the valleys, and the uncovered slopes; I cannot say with absolute exactness at what altitude phanerogamic vegetation ceases, but at 1000 ft. it is there very scarce. The same majestic scenery appears in Lutke Land, the interior mountains rising from seas of ice, with glaciers descending to the ocean, but there is very little difference between the floras on the north and south shores of the Matyushin Shar. Farther north, on the Pachtussow Islands and the mainland in the zone of 74–75°, I gathered some fifty phanerogamic plants, a serious falling off from the number recorded from the shores of the Matyushin Shar, in the zone of 73–74°. There now remains for the botanical explorer the examination of the shores of Barents Land, in the zone of 75–77°, which, so far, has only been credited with some sixteen species.

I will now give a few details in regard to the flora.

1. RANUNCULUS PALLASII Schl. Rare on Dolgoi Island; found in one lake only. Common in lakes around Habarova. Abundant in lakes and meres all over Waigats, perfuming the air in their vicinity with its delicious scent. Not met with by me in Novaya Zemlya proper, but abundant near the Notschujew River, Lutke Land, north side of the Matyushin Shar, near entrance to the Kara Sea.

2. R. LAPPONICUS L. Only met with by me at Cape Matiusela, island of Waigats, where it grew in abundance on sphagnum-covered swamps.

3. R. HYPERBOREUS Roth. A very common plant growing in swamps. Found on Dolgoi Island, in the neighbourhood of Habarova, all over Waigats, in Novaya Zemlya, and Lutke Land; specimens from Beluga Bay, 73° 20′ N., being of the same character as the plant in North Russia. After an examination of scores of specimens, I cannot separate *R. Samojedorum* Rupr. from this species. Plants agreeing in every respect with Ruprecht's description of *R. Samojedorum** were brought from Dolgoi Island; and Cape Greben, Waigats.

4. R. PYGMÆUS Wahlenb. A very generally dispersed plant, and variable in growth; on bleak and exposed situations the blossoms are minute and resting on the ground; in sheltered and moist spots this plant attains a height of 4 in. Cape Greben; south shores of Waigats; Cape Matiusela; Dolga Bay, 150 ft.; Neckwatowa; Islands Kostin Shar; Nameless Bay; Beluga Bay, Lutke Land. Ziwolka Fiord, 74° 25′.

5. R. NIVALIS L. A common species, extending from the shores of the Russian mainland to the extreme point visited in Lutke Land. Still, out of more than a hundred examples of this and the following plant gathered at many stations, *R. sulphureus* appears in the collection in the proportion of five to one. Habarova; south shores of Waigats; Dolga Bay; Neckwatowa; Islands, Kostin Shar; Gubina Bay; Beluga Bay, Lutke Land; Ziwolka Fiord; Pachtussow Islands.

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* Symb. Hist. Plant. Ross., F. J. Ruprecht, St. Petersburg, 1846, p. 18.

6. R. SULPHUREUS Sol. As a rule this is a finer and more showy plant than *R. nivalis.* There are specimens from Cape Matiusela seven inches in height, with blossoms over an inch in diameter. The range and distribution of this species coincides with that of *R. nivalis.* Dolgoi Island; south shores of Waigats; Cape Matiusela; Dolga Bay; Neckwatowa; Nameless Bay; Gubina Bay; Goose Land; Beluga Bay, Lutke Land; Pachtussow Islands; Ziwolka Fiord.

7. R. ACRIS L. f. BOREALIS Trautv. The commonest buttercup throughout the regions visited. Extending from the sea-shore to altitudes of two hundred feet and more. This is a most variable plant, and without the connecting links it would puzzle the ordinary observer to decide that the extremes belong to the same species. There are in the collection specimens from Waigats, and Lutke Land as well, with stalks over eight inches in length, and blossoms an inch and a quarter in diameter; and from the same localities specimens with stalks of not more than half an inch, and blossoms three-quarters of an inch in diameter. Habarova; south shores of Waigats; Cape Matiusela; Dolga Bay; Islands Kostin Shar; Neckwatowa; Goose Land; Nameless Bay; Gubina Bay; Silver Bay; Beluga Bay, Lutke Land.

8. R. AURICOMUS L. Found at Cape Voronoff, 2nd of July, 1897, where it grew in beds on sandy hillocks close to the sea-shore. It was not uncommon around Beluga Bay, Lutke Land, reaching an altitude of one hundred feet. It does not appear in the collections from any of the other stations. It is just possible that this may be the *R. affinis* recorded by other botanists from Novaya Zemlya, but after a careful comparison with specimens of *R. affinis* from many quarters, including Robert Brown's type in the herbarium of the British Museum (Natural History), I cannot assign these plants to anything but true *R. auricomus* L. Mr. Burkill attached the following note to the specimens of this plant submitted to him:—"*R. affinis* R. Br., a North American plant—perhaps a confusion of two or three forms specifically distinct—is in its arctic type difficult to distinguish from *R. auricomus* L. Types of the original plant so named by Robert Brown exist at Kew and at the British Museum, and may be, as Lange points out, distinguished from *R. auricomus* by the longer head of fruit. To *R. auricomus* I refer the plant from Waigats collected on the Nordenskiold Expedition, and named *R. affinis*, a specimen of which exists at Kew. Fellmann (*Plantæ Arcticæ*, no. 5) has distributed a very similar plant from Eastern Lapland. You were fortunate or careful enough to collect the round head of fruits, which is that of *R. auricomus*, and not of *R. affinis.* The latter therefore is apparently to be removed from the Novaya Zemlya list (Waigats zone), and to be replaced by *R. auricomus.*"

9. CALTHA PALUSTRIS L. An extremely common plant throughout the regions visited, growing round lakes and meres, in bogs, and by the banks of rivulets. It shows great variations according to locality. In favoured spots the plants are as large, and with as fine

blossoms, as typical specimens from an English meadow, whilst at high altitudes, for instance at three hundred feet in Lutke Land, we find the plant degenerated to an almost leafless stem, showing only a small blossom of a quarter of an inch diameter just protruding above the damp moss, in which the stalk lies hidden. There are specimens in the collection from Waigats with flowers two inches in diameter. Dolgoi Island; Habarova; Cape Greben; south shores of Waigats; Cape Matiusela; Dolga Bay; Neckwatowa; Kostin Shar; Goose Land; Gubina Bay; Beluga Bay, Lutke Land; Pachtussow Islands; Ziwolka Fiord.

10. Thalictrum alpinum L. Is not uncommon from the shores of the mainland of Russia to Lutke Land. It affects protected spots, growing under the sides of runnels, on sheltered banks, or in the clefts of rock exposures. Habarova; south shores of Waigats; Dolga Bay; Neckwatowa; Islands Kostin Shar; Gubina Bay; Beluga Bay, Lutke Land; and many other localities.

11. Papaver nudicaule L.—Of the entire flora in the polar and arctic regions, no flower is dearer to the explorer than the arctic poppy. Its beauty, its delightful shades of colour from white to bright yellow and delicate pink, charm the eye. Its abundance and vitality under apparently the most adverse circumstances make a deep impression. On the bleakest and most exposed surfaces, as far north as the explorer has reached on land, this remarkable flower has been met with. Cold, snow, and tempest seem to make no impression on it. Habarova; Dolgoi Island; Waigats; Novaya Zemlya generally; Lutke Land generally; Pachtussow Islands; Ziwolka Fiord. Seeds of this plant gathered in Novaya Zemlya, sown in the end of May, 1898, came up strongly in fourteen days, and one blossomed (white) first week of July.

12. Mathiola nudicaulis Trautv. Is extremely abundant over Waigats and Novaya Zemlya, decreasing, however, as we cross Matyushin Shar and enter Lutke Land. Its beautiful pink blossoms (sometimes pure white) are a distinct feature in the floral display. This plant especially affects areas covered by marine boreal clay, its strong roots penetrating several inches into the ground. Habarova; Waigats generally; Novaya Zemlya generally; Beluga Bay, Lutke Land; Pachtussow Islands; Ziwolka Fiord.

13. Cardamine pratensis L. Generally distributed in suitable places from the shores of the Russian mainland to Lutke Land, where it was found in flower on the Pachtussow Islands, 74° 24′ N. Dolgoi Island; Habarova; Waigats; Novaya Zemlya; Beluga Bay, Lutke Land; and Ziwolka Fiord. The depth of the tubular part of the flower, *i.e.* length of claw of petal, may be worth mention, for it is found to be a very variable feature, longer in some localities than in others, but probably having a definite relation to the tongues of the insects which fertilise the flower.

14. C. bellidifolia L. Not met with by me on Dolgoi Island, but extremely common all over Waigats, the same in Novaya Zemyla, and was found in flower at an altitude of 1000 ft. in the neighbourhood of Ziwolka Fiord, Lutke Land, 74° 25′ N. It

attains the highest altitude of any plant I have observed in Novaya Zemlya.

15. Arabis alpina L. Found in the neighbourhood of Habarova; on Waigats, but not common; at Neckwatowa, Novaya Zemlya; rare. Not found or overlooked in Lutke Land.

16. A. petræa Lam. Found in considerable quantity growing in clefts of a cliff at the head of Dolga Bay, Waigats; at Neckwatowa, at Nameless Bay, and Gubina Bay, where it grew in clumps on the gravel terraces a few feet above tide-level. Not found or overlooked in Lutke Land. This plant has in some instances a delicate perfume.

17. Eutrema Edwardsii R. Br. A very common and generally distributed plant over the tundra land of Waigats; common on Dolgoi Island; abundant on Novaya Zemlya; common around Beluga Bay, Lutke Land, but not observed by me farther north than 73° 25′.

18. Braya alpina Koch. A very common and very pretty plant, growing all over the island of Waigats, especially affecting areas covered by marine boreal clay; into this its strong roots descend perpendicularly to as much as seven or eight inches. It is common around Habarova, but not met with or overlooked by me on Dolgoi Island. Common over Novaya Zemlya, and met with in flower at Beluga Bay and Silver Bay of Lutke Land.

19. Cheiranthus pygmæus Adams. Only met with 31st July at one station, Beluga Bay, Lutke Land, where a small number of plants were growing together at an altitude of 100 ft. The largest plant stood some seven inches above the ground; its seed-pods, some three inches in length, were so ripe that on gathering the plant they opened and the mature seed fell out. The impression given me was that the smaller plants surrounding it were seedlings of a prior season.

20. Cochlearia fenestrata R. Br. Many specimens of scurvy-grass were brought back from various localities, but all have been pronounced by competent authorities *C. fenestrata*. On Dolgoi Island; around Habarova, all over Waigats; Novaya Zemlya, and in Lutke Land it is a common plant. It is noticeable that when growing close to the shore it is generally a close-leaved procumbent herb, becoming more luxuriant at higher altitudes. On Waigats, at an elevation of 250 ft., it grew as a straggling plant with stalks seven to eight inches high. It was growing abundantly from shore-line to summits of the Pachtussow Islands; likewise in Ziwolka Fiord.

21. Schivereckia podolica Andrz. Only met with by me at Neckwatowa, Novaya Zemlya, in July, 1895.

22. Draba alpina L. Is the commonest and most widely distributed of the *Drabæ* over Dolgoi Island, Waigats, Novaya Zemlya, and Lutke Land. It extends from the sea-shore to elevations of 400 ft. As a rule the blossom is of a bright yellow.

(To be continued.)

BIBLIOGRAPHICAL NOTES.

XVI.—Fabricius' 'Enumeratio Plantarum Horti Helmstadiensis.'

The names published by Heister in his *Systema Plantarum* (1748) are of course not taken up by those who adopt 1753 as the starting-point of nomenclature. It seems, however, to have been overlooked by many workers that Heister's names were brought into use by Fabricius, his successor in the care of the Helmstadt Garden, who published two editions of an *Enumeratio Methodica Plantarum Horti Medici Helmstadiensis*, dated respectively 1759 and 1763. A "third edition" issued in 1776 after his death is a mere reprint, to which a supplement of twenty-four pages is added; to this no author's name is appended, but it is of no importance, being merely of such plants in Linn. Sp. Pl. ed. 2 as had been added to the Garden. In his preface Fabricius pays a high and well-deserved tribute to Heister, whose *Systema* is an interesting and suggestive little volume.

Not only are the names published by Fabricius to a considerable extent ignored in the *Index Kewensis*, but they seem to have escaped the notice of nomenclaturists at home and abroad. The transatlantic reformers to whom we owe the American Check-list, and their chief, Dr. Britton, in his *Illustrated Flora*, make, so far as I have consulted them, no reference to the *Enumeratio;* and while they rightly disqualify Heister's names on account of their date, it does not seem to have occurred to them that these names might have obtained currency after 1753. The Berlin rules doubtless exclude such names; but both American and English systematists must take note of them, and I suspect that a careful investigation of the two editions of Fabricius will result in a good many changes in the American Check-list and elsewhere. Some of these will result in the retention of well-known names which the application of the time-limit of 1753 has seemed to exclude; others show that the introducers of new and strange names on the score of priority have not arrived at finality in their researches, although they have added considerably to the stock of useless and unnecessary synonymy. The authority for certain names will also have to be changed; thus *Meibomia*, which appears in the Check-list as of "Adans. Fam. Pl. ii. 509 (1763)," should stand, as cited by Mr. Hiern in the Welwitsch Catalogue, "Heister ex Fabric. Enum. Pl. Hort. Helmstad. ed. i. 168 (1759)."

One or two examples will show the kind of change which may be expected when the claims of Fabricius have been duly considered, and for this purpose I have chosen names which appear in our British floras.

The name *Specularia*, published by Heister in 1748, was taken up by Alphonse De Candolle in 1830—a publication which is antedated (Heister's name being disqualified by time-limit) by *Legousia* of Durande, Fl. Bourgogne, i. 371 (1782). This was taken up by S. F. Gray (Nat. Arr. ii. 110 (1821)), and is adopted (misspelt *Legouzia*) by Dr. Britton both in the Check-list and in his

Flora. But the name *Specularia* appears in Fabricius, ed. 1, 121, with synonymy, and with diagnosis in ed. 2, 225: the synonymy therefore stands:

Specularia Heist. ex Fabr. Enum. Pl. Hort. Helmst. ed. 1, 121 (1759), ed. 2, 225 (1763).

Legousia Dur. Fl. Bourgogne, i. 37 (1782).

Under *Legouzia* Dr. Britton gives three new combinations which will have at once to be relegated to that limbo of unnecessary nomenclature already so largely peopled by transatlantic creations. Mr. Druce (Fl. Berks. 328), who had previously called attention to the genus,* gives *Legousia Durandi* Delarbre (1800) as the name under this genus for *Campanula Speculum* L.; but this can in no case be maintained, for *Durandi* is neither the oldest specific name nor the earliest under the genus, that being *L. arvensis* Dur. (1782), which is rightly adopted by S. F. Gray. The name of our British plant will remain *Specularia hybrida* A.DC., as it stands now in the *London Catalogue.*

By the help of Fabricius, the absurd name *Couringia*, which, owing to Adanson's misprint, has been establishing itself in our lists, may entirely disappear: it stands as *Conringia* in Fabr. *Enumeratio*, ed. 1, 160 (1759). This happily disposes of Mr. Druce's note on the genus (Fl. Berks. 58): the two new synonyms which he (*l. c.*) proposes for *C. austriaca* Sweet, an exotic species "found on waste ground," may join Dr. Britton's names under *Legousia.*

Among the names not in the *Index Kewensis* is *Umbilicaria* Heist. ex Fabricius, *op. cit.* ed. 1, 42 (1759), ed. 2, 76 (1763), which must replace *Omphalodes* Moench. Meth. 419 (1794). Both genera are based upon the same two Linnean species, which are indicated by their Linnean numbers and diagnoses in the second edition of Fabricius. This raises an interesting point as to whether such indication by number will be considered as entitling Fabricius to be considered the author of the names *Umbilicaria linifolia* and *U. Omphalodes*, which these two species should take. The genus of lichens bearing the same name is of much later date (1789), and will have to be abandoned by those who object to a similar name being employed in phanerogams and in cryptogams.

Another instance of a name which seems to have been entirely overlooked—it is neither in the *Index Kewensis*, nor in Pfeiffer's *Nomenclator*, nor in any of the books cited above—may be found in *Sphærocarpus*, the earliest name for the genus which American botanists retain as *Neslia*, and for which Mr. Druce (Fl. Berks. 69†) revives Medik's *Vogelia* (1792). Exception may be taken to the adoption of the name *Sphærocarpus* on the ground that Adanson used it in the same year for a genus of cryptogams—whether earlier in the year I do not know. I am inclined, however, to think that even then the name may stand, for it is quoted by Fabricius in his first edition (1759), p. 28, as a synonym under "Rapistrum arvense folio auriculato T." as "*Sphærocarpus* Heister." In any case, it must be cited as a synonym.

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* In Ann. Scott. Nat. Hist. 1896, 38–53—a Rafinesquian paper which is likely to give trouble to future nomenclaturists.

† He gives among the synonymy "*V. paniculata*, leges"; for an explanation of this authority see Journ. Bot. 1898, 106. The name, however, is given by Hornemann, Hort. Hafn. 594 (1815) as cited in the *Index Kewensis.*

As an example of a name which concerns both British and American botanists, I will cite *Salomonia* (Heister ex Fabricius, *l. c.* ed. 1, 20, 1759), which not only supersedes *Polygonatum* of Adanson (1763), but displaces *Salomonia* of Loureiro (1790), for which a new name will have to be found. The synonymy quoted by Fabricius (in part identical with that of Linnæus) precludes any possibility of doubt as to what plant is intended, and *Salomonia Polygonatum* is the type of the genus.

I do not propose to go further into an investigation of Fabricius's work, but I have said enough to show that it has been generally overlooked. To some the discovery will form an argument in favour of the adoption of the "fifty years' limit" advocated by the Berlin botanists: others will revel in the abundant possibilities it affords for the creation of new combinations—to each of which may be added "mihi," after the style with which we have recently been made familiar.

James Britten.

SHORT NOTES.

Carex pulicaris on chalk. — A recent record of *Carex pulicaris* in Bedfordshire has been a desideratum. On July 16th I found a quantity in fine condition on a dry chalk bank at Streatley, mixed up with *Carex præcox*, *Pinguicula vulgaris*, *Parnassia palustris*, *Onobrychis sativa*, *Hippocrepis carnosa*, and the usual chalk plants. *Pinguicula vulgaris* was recorded by Mr. J. Pollard (Journ. Bot. 1875, 211) in a similar site at Pegsdon, some four miles east of Streatley. *Pinguicula* and *Parnassia* have already been recorded at Streatley; but *Carex pulicaris* is an addition. It would appear that these three bog plants are survivals of a bog which has long since been washed away down the valley. The only other recent record of *Pinguicula* in Beds was in a bog resting on chalk marl at Totternhoe; this bog has lately been drained and cultivated. The Streatley and Pegsdon sites are at a very much higher level than the chalk marl, with no spring and no stagnant surface water.—C. Crouch.

Polyporus umbellatus Fries.—I wish to place on record another locality for this rare and interesting fungus, hitherto only recorded from Epping Forest. A few days ago I received a specimen gathered from a wood at Inval, near Haslemere. This species is allied to *P. intybaceus*, and differs in the numerous much-branched pileoli being circular and depressed; in *P. intybaceus* they are dimidiate. —E. W. Swanton.

Dedication of Jacksonia Raf.—In this Journal for 1886, p. 139, I quoted Pfeiffer as the authority for supposing that in this genus Rafinesque intended to commemorate the English botanist George

Jackson. It seems, however, that this was not the case; Asa Gray (Amer. Journ. Sci. xl. 228 (1841)) writes: "*Jacksonia*, Rafinesque changed in 1819 to *Polanisia*, probably on account of the *Jacksonia* of Brown, 1812, *by which General Jackson lost a genus*."—JAMES BRITTEN.

ELATINE HYDROPIPER L. IN SURREY.—When visiting Cutmill Pond, near Godalming, Surrey, in company with Miss M. Phear, on August 31st, we found a considerable abundance of *Elatine hexandra* in full flower growing both in and out of the water amidst the turf of *Eleocharis acicularis* that bordered the pond. We also found *E. Hydropiper*, but more sparingly: the flowers were over, and the characteristic hooked seeds well formed. Owing to the dry season, the water was at a lower level than usual, and this may have favoured the growth of the waterworts. We are not aware that *E. Hydropiper* has been recorded hitherto from any English locality except Frensham Pond, near Farnham, quoted by Hooker and others in their manuals of British Botany.—G. LISTER.

PLANTAGO MEDIA IN ANTRIM (p. 351).—If Mr. Brenan will look at *Irish Naturalist*, v. 311 (1896), he will find two Antrim stations mentioned in Mr. J. H. Davies's "Notes on some Casuals in County Antrim."—R. LLOYD PRAEGER.

LATHYRUS APHACA IN CAMBRIDGESHIRE (p. 353). — Soon after the publication of my note, Mr. Reader informed me that Mr. Evans rediscovered *Lathyrus Aphaca* in an old locality. Mr. H. N. Dixon writes to confirm this, saying that he gathered it on the Hills Road, a little outside Cambridge, in 1878 or 1879. This goes to show that it is permanent there. Mr. Dixon also informs me that he has a specimen from Stapleford, collected in 1878.—A. B. JACKSON.

CAMBRIDGESHIRE PLANTS (p. 246). — To those unacquainted with the flora of Cambridgeshire the formidable list of "extinctions" given by Mr. W. West, jun., on p. 247 may seem appalling. In his opinion Middlesex is the only county which rivals ours in this unenviable distinction. To avoid misapprehension it seems desirable to point out that, of the forty-nine species given in the list, no fewer than thirty-four are inserted in Prof. Babington's *Flora* solely on the testimony of botanists termed by him "ancient authorities"—ranging from 1685 to 1820—most of these species for a single station only; and, as he remarks, "the localities have not been confirmed by recent observers." Of the remainder, five occurred only on a piece of boggy heath at Gamlingay, the drainage of which had, as Prof. Babington observes, been destructive to some plants even before the *Flora* was issued. We must inevitably suffer, as other counties do, from the drainage and cultivation of many hitherto neglected spots, but I trust our plants are not disappearing so rapidly as Mr. West would lead us to believe. I may remark that *Lathyrus Aphaca* has not "disappeared from all its localities near Cambridge"; this year there are five distinct patches of it at a station not far from the town, where I have known it for fifteen years. The locality is possibly one of those intended in the *Flora*, but for obvious reasons I forbear giving more precise details.

Parnassia palustris it is stated "has not been recorded in the county for forty years." I first saw it on Chippenham Fen in 1890; it is still plentiful there, and is spread over a considerable area. Two other plants, *Chrysanthemum segetum* and *Allium ursinum*, are not so rare as would be imagined from Mr. West's notes; the former I have seen brought in large bunches by children from cornfields at Histon for sale in the town, and the latter, though very local, is so abundant in one part of Hardwick Wood—apparently an unknown locality for it—that the plants certainly number many thousands.—G. Goode.

Lophocolea spicata Tayl. in Scotland. — Mr. Symers M. Macvicar has sent me for confirmation specimens of this rare species, collected by him in shallow narrow crevices of rock just above high-water mark at Moidart, West Inverness. First record for Scotland. —W. H. Pearson.

Lancashire and Cheshire Rubi.—Having collected a number of the Rubi of this district at the request of the Rev. W. Moyle Rogers, who kindly undertook to name them for me, I am able to give the following list of localities additional to those already published. New county records are indicated by an asterisk. Mr. Wilson, of Ilkley, obliged me with a number of West Lancashire specimens which he had collected this year; these are distinguished by (W) following the locality. All the specimens have been seen by Mr. Rogers, except those marked †:—

Rubus fissus Lindl. Barnacher Moor, near Garstang, 60 (W).—*R.* **Lindleianus* Lees. Scorton and Garstang, 60 (W). Longridge† and Ribchester,† 60. Walton, 59. — *R. rhamnifolius* W. & N. (sp. coll.). Garstang, 60 (W). Walton, 59. — *R.* **Scheutzii* Lindeb. Near Catshaw, Wyresdale, alt. 600 ft., 60 (W). — *R.* **pulcherrimus* Neum. Silverdale and Yealand Conyers, 60. Eastham, 58. Very frequent in West Lancs. — *R. mercicus* var. **bracteatus* Bagnall. Walton, 59. Mr. Bagnall says this exactly resembles the form it assumes in quarries and rocky places in Warwickshire. In these places it is weaker, and grows with an arcuate prostrate habit (Exch. Club Rep. 1894, 440). At the foot of Longridge Fell, 60.—*R. villicaulis* var. **Selmeri* Lindeb. Pilling, 60 (W). Simmonswood Moss, 59. Longridge† and Stonyhurst,† 60. — *R.* **gratus* Focke. Common in S. Lancs, 59 (*vide* Exch. Club Rep. 1894, 440), and in the Ribble and Hodder district, 60. — *R.* **rusticanus* Merc. Scotforth, 60 (W). Abundant in 58 and 60, less common in 59.—*R.* **lentiginosus* Lees, a form with longer petals and untypical foliage, approaching *R. Questierii* Lefv. & Muell. Walton, 59.—*R. Sprengelii* Weihe. Eastham, 58. Walton, 59. Ashton,† 59. Preston† and Longridge,† 60.—*R.* **leucostachys* Schleich. Silverdale, 60. Walton, 59.—*R. infestus* Weihe. Walton and Orrell, 59. Near Preston, 60. — *R. podophyllus* P. J. Muell. Near Ashton-under-Lyne,† 59. Named by Mr. Linton. — *R. oigoclados* var. **Newbouldii* Bab. Walton, 59. — *R. rosaceus* var. *hystrix* W. & N. Eastham, 58. Simmonswood Moss, 59. — Var. **silvestris* R. P. Murr. Eastham, 58. Ince Blundell, 59.—Var. *infecundus* Rogers. Longridge Fell, 60. — *R. Koehleri* var. *pallidus* Bab. Grizedale, 60 (W). Very common about Yealand and Silverdale, 60. — *R. dumetorum* var. *ferox* Weihe. Wallasey, 58. Hightown, 59. — Var. **concinnus* Warren. Walton, 59. — *R. corylifolius* Sm. var. **sublustris* Lees. Silverdale, 60. Garstang, 60 (W). Frequent throughout the Mersey province. A curious form with large septenate leaves, and calyx clasping fruit, is frequent about Walton, 59. — *R. cæsius* var. *aquaticus* W. & N. Hightown and Crosby, 59. — *R. rosaceus* var. *sylvestris* × *Sprengelii*. Ince Blundell, 59. "A very interesting hybrid, which has every appearance of being rightly named" (Mr. Rogers in Exch. Club Rep. 1896, 519). —*R. mercicus* var. *bracteatus* × *leucostachys*. Walton, 59. "These specimens seem rather nearer *R. mercicus* than to *R. leucostachys*, but Mr. Wheldon is probably right in considering them a hybrid" (Mr. Rogers in Exch. Club Rep. 1896, 519).—*R. cæsius* × *Idæus*. Fazackerley, 59. Mr. Rogers says: "Looks like the hybrid which Prof. Babington latterly thought his var. *intermedius* might be" (Exch. Club Rep. 1896, 519).—J. A. WHELDON.

MONMOUTH AND WEST GLOUCESTER RECORDS. — The following species not recorded for v.-cc. 34 and 35 in Top. Bot. have been noticed this year:—*Caucalis nodosa* Scop. 35. Plentiful on Caldicot and Roggiett Moors. — *Galium tricorne* Stokes. 35. Cornfields, Llanmelin. — *Specularia hybrida* A. DC. 34. Beachley; queried for v.-c. 34 in Top. Bot. — *Veronica scutellata* L. 34. Madget.—*Orobanche minor* L. (*eu-minor*). 35. Clover crops near Chepstow.—*Osmunda regalis* L. 35. A solitary plant in a marshy thicket at Shirenewton; first noticed by Miss Woodall. In the Report of the Botanical Exchange Club for 1897 Mr. Charles Bailey mentions the following species as "new county records for v.-c. 35":—*Polygala vulgaris* L., *Arenaria serpyllifolia* Pursh, *Geranium dissectum* L., *Euonymus europæus* L., *Conium maculatum* L., *Lamium Galeobdolon* Crantz, *Salix cinerea* L., *Potamogeton perfoliatus* L., and *P. crispus* L., all of which were recorded from the county in my paper on "Recent Additions to the Flora of West Gloucester and Monmouth" in this Journal for 1894, pp. 263–271, with the exception of *Lamium Galeobdolon*, which, like the rest, is a very common plant in this district.—W. A. SHOOLBRED.

NOTICES OF BOOKS.

RECENT LITERATURE ON ALGÆ.

In the *Bulletin de l'Herbier Boissier* for June, 1898, Prof. Chodat publishes a continuation of his "Études de Biologie Lacustre." Under the title "Recherches sur les algues littorales" he deals with (a) perforating algæ in freshwater shells, (b) chalk-devouring algæ which produce markings on pebbles by means of decay, (c) *Coleochæte pulvinata* and the germination of its oospores, (d) littoral algæ, more particularly *Cladophora glomerata* and *Batrachospermum densum*.

After some introductory remarks concerning littoral freshwater algæ in general, Prof. Chodat proceeds to the subject of perforating algæ, which he divides into two groups: 1. Perforating algæ proper. 2. Carious algæ. Of the former group he describes a new genus and species of *Chlorophyceæ*, *Foreliella perforans*. This alga penetrates the living shells of *Anodonta anatina* var. *nycterina* Boung., finding its way through the shell to the animal itself. The obvious preference of *F. perforans* for living rather than dead shells leads Prof. Chodat to indulge in speculations on the possible symbiosis of animal and alga.

A new species of *Gongrosira*, *G. codiolifera*, is described as growing on chalk-stones, in or near the water. Its rhizoids penetrate the chalk, and from these there arises either a pseudoparenchymatous mass of cells, or the ordinary filamentous growth. The peculiarity of *Gongrosira codiolifera* is the production of swollen cells borne on the filaments, which become detached and form propagules. These are figured in various forms and conditions. Unfortunately no diagnosis of the new species is given.

Growing together with *G. codiolifera* is found an alga which is considered by Prof. Chodat to belong to *Hyella*, and he describes it as *H. jurana*, n. sp.

The next section of this paper deals with the small furrowed markings on pebbles found on the beach of jurassic lakes. Various theories have been propounded to account for these markings, but Prof. Chodat agrees with none of them, and attributes the furrows to the action of species of *Schizothrix* which he finds penetrating the stones. He considers that other *Cyanophyceæ* follow in the wake of these *Schizothrix*, but that the actual boring is accomplished by species of *Schizothrix*, *Plectonema*, and *Phormidium*. As an explanation of this boring process, he suggests that the algæ secrete an acid to dissolve the chalk, but he has found no trace of such acid in portions of the stone attacked by the algæ. On the contrary, the reaction has often been alkaline. He is therefore led to form theories on the complicated chemical action of *Schizothrix* on the chalk, which has marvellous results "selon le temps et les circonstances." He acknowledges however that the origin of these markings is still far from being completely understood.

The old discussion of alternation of generations in *Coleochæte pulvinata* is next dealt with, and the systematic position of the genus. Prof. Chodat maintains that *Aphanochæte*, by reason of its heterogamy, forms a link between *Coleochæte* and the *Chætophoraceæ;* and he believes that *Coleochæte* forms the end of a series of branched algæ which are provided with hairs. He will have nothing to do with the idea that this genus forms the starting-point of the *Archegoniatæ;* it belongs to the heterogamous *Chætophoræ*, and the germination of its oospore takes place under special conditions. That is all. He speaks of Prof. Oltmanns' paper, "Die Entwickelung der Sexualorgane bei *Coleochæte pulvinata*," in *Flora*, 1898, pp. 1–14, and points out that this author agrees with him in rejecting the idea of homology between the oogonium of *Coleochæte* and that of *Florideæ* and *Muscineæ*. On the other hand, he refuses to accept the parallel drawn by Prof. Oltmanns between the oogonium of *Coleochæte*, together with the cells immediately produced by it, and the spore of *Marchantia* with the thallus arising therefrom. Prof. Oltmanns is apt to bring forward somewhat strained instances of alternation of generation.

A short list is next given of the shore algæ of the Lake of Geneva, with remarks on some of the genera, and a short account of the escape and subsequent development of zoospores in *Cladophora glomerata*. The cultivation of this alga in nutritious solutions is said to lead to the swelling of certain cells of the thallus, which then bud off, and so closely resemble the *Centrosphæra* of Borzi, that Prof. Chodat considers these two forms identical. A note on *Batrachospermum densum* describes its growth from the creeping thallus, without the intervention of the *Chantransia*-like form. The author regards the hairs of this plant as respiratory organs, establishing a communication through the surrounding mucus with the outer air. But in the same line he points out that when cultivated in nutritive solutions, these hairs diminish or disappear. Does he consider that an extra food-supply does away with the necessity of breathing?

It is to be regretted that throughout the whole paper no measurements are given, either in the text or the figures.

Major Reinbold gives in *Hedwigia*, Bd. xxxvii. 1898, a short list of thirty-eight marine algæ collected by Herr Nemetz in the Island of Rhodes. Two of these are new species of *Siphonocladus*, *S. Rhodensis* and *S. concrescens*. The western shores of the Mediterranean have been so well examined that it is interesting to have a record of algæ from one of the eastern islands. The list includes *Hypnea Valentiæ* Mont., a common form in the Indian Ocean, and recorded from the West Indies by Mazé and Schramm.

ETHEL S. BARTON.

Syllabus der Pflanzenfamilien. Von Dr. ADOLF ENGLER. Zweite umgearbeitete Ausgabe. Pp. xii, 214. Berlin: Borntraeger. 1898. Price 3 M. 80 Pf.

As the principal editor of, and one of the chief contributors to the *Naturlichen Pflanzenfamilien*, which after a busy ten years is now all but completed, Prof. Engler speaks with authority on the systematic arrangement of plants. Hence the *Syllabus*—presenting in a concise form the recent views of the German school of systematists which has arisen under the energetic tutelage of the Director of the Berlin Gardens and Museums—will be welcomed by the increasing number of botanists who are interested in the study of plant relationships and distribution. It may be useful to review briefly the plan of arrangement adopted. The plant-world is divided into four sections (Abteilung). Section I. MYXOTHALLOPHYTA are of course the *Myxomycetes*, which form a very distinct group on the borderland between plants and animals. Section II. EUTHALLOPHYTA includes four subsections, of which the first, *Schizophyta*, comprises two classes, *Schizomycetes* or Bacteria in general, and *Schizophyceæ* or the simple blue-green algæ (*Cyanophyceæ*) of most text-books. The second subsection is the *Flagellatæ;* the third, *Euphyceæ*, comprises the remaining algæ (eight classes); and the fourth, *Eumycetes*, the Fungi in four classes, Phycomycetes, Basidiomycetes, Ascomycetes, with a 'nebenklasse' Lichenes, and Laboulbeniomycetes. Section III. EMBRYOPHYTA ZOIDIOGAMA, the archegoniate plants, has the two subsections *Bryophyta* and *Pteridophyta* with the usual subdivisions; and Section IV. EMBRYOPHYTA SIPHONOGAMA, are the seed-plants with the old subsections, indicated by Robert Brown, of *Gymnospermæ* and *Angiospermæ*.

The generally recognized orders of Gymnosperms figure as classes, comparable with the two great classes of Angiosperms. Thus the former comprise six classes, Cycadales, Bennettitales, Cordaitales, Ginkgoales, Coniferæ, and Gnetales; the latter two, Monocotyledonæ, and Dicotyledonæ. This view emphasizes the striking differences between the known types of Gymnosperms as compared with Angiosperms. The arrangement of the latter is based on that of Eichler, with certain modifications, many of which are the outcome of the work of the last ten years represented in the *Pflanzenfamilien*. Class I. Monocotyledons is arranged in eleven series as follows:—

1. *Pandanales* (Typhaceæ, Pandanaceæ, Sparganiaceæ).
2. *Helobiæ* (Fluviales) (Potamogetonaceæ and allied orders, Alismaceæ, Hydrocharideæ).
3. *Triuridales.*
4. *Glumifloræ* (Gramineæ, Cyperaceæ).
5. *Principes* (Palmæ).
6. *Synanthæ* (Cyclanthaceæ).
7. *Spathifloræ* (Araceæ, Lemnaceæ).
8. *Farinosæ* (Restiaceæ, Eriocaulaceæ, &c.; Bromeliaceæ, Commelinaceæ, Pontederiaceæ, &c.).
9. *Liliifloræ* (Juncaceæ, Liliaceæ, Amaryllidaceæ, Taccaceæ, Dioscoreaceæ, Iridaceæ).
10. *Scitamineæ.*
11. *Microspermæ* (Burmanniaceæ, Orchidaceæ).

We see here an attempt to arrange as far as possible in linear series the orders of Monocotyledons, starting with those in which the flowers are extremely simple and irregular or indefinite in the number of their parts, as is generally the case in the first three series. In Glumifloræ the number of parts is generally small and definite, with the flowers naked. The next three series form a group in which a simple perianth is the rule, or its absence may be explained by reduction, while there is also a marked tendency to fixity of number of the stamens and carpels. The remaining four series are characterized by the pentacyclic trimerous flowers, which we have learnt to regard as the "typical" monocotyledons. In series 8 and 9 hypogyny and actinomorphy prevail; in series 10 and 11 epigyny and zygomorphy. Dicotyledons are arranged in two subclasses: Archichlamydeæ with twenty-six series, and Metachlamydeæ or Sympetalæ with eight. In the former, *Casuarina* stands first as series *Verticillatæ*, cut off from the rest of the subclass by its numerous macrospores and the other well-known characters which distinguish the course of development in the ovules. In the other twenty-five series an attempt is again made at an arrangement as far as is possible in linear series, from the typically simple naked flowers like those of *Salicineæ*, through the typically apetalous (*Urticaceæ*, &c.), polypetalous and thalamifloral (Ranales), polypetalous and calycifloral, to the polypetalous and epigynous, series 26 being the *Umbellifloræ*.

The arrangement of *Sympetalæ* is in eight series—

1. *Ericales.*
2. *Primulales.*
3. *Ebenales.*
4. *Contortæ* (Oleaceæ, Gentianaceæ, &c.).
5. *Tubifloræ* (Convolvulaceæ, Polemoniaceæ, Boragineæ, Scrophulariaceæ, Labiatæ, &c.).
6. *Plantaginales.*
7. *Rubiales* (Rubiaceæ, Caprifoliaceæ, Valerianaceæ, Dipsaceæ).
8. *Campanulatæ* (Cucurbitaceæ, Campanulaceæ, Compositæ).

In series 1 and 2 polypetaly sometimes appears; the flowers are generally hypogynous. In series 3 sympetaly is a fixed character, but the number of stamens is sometimes very large. Hypogyny is the rule. Series 4 differs in having only one staminal whorl. The remaining four are exclusively sympetalous and haplostemonous, with generally two carpels, which are completely united. The flowers are frequently zygomorphic. In 5 and 6 the corolla is hypogynous, in 7 and 8 epigynous. *Compositæ* ends the series as the acme of simplification by reduction and union of parts. The position assigned to *Cucurbitaceæ* next to *Campanulaceæ*, though strange to English systems of classification, is not new to Continental arrangements. It seems a more natural one than its place towards the end of *Polypetalæ*. Under each natural order (family) is a concise diagnosis, followed in most cases by equally concise descriptions of subfamilies and other divisions, with mention of the most commonly occurring genera, or those of importance from some economic point of view.

A. B. Rendle.

ARTICLES IN JOURNALS.[*]

Annals of Botany (Sept.). — W. R. Shaw, 'Fertilization of *Onoclea*' (1 pl.).—H. M. Ward, 'Some Thames Bacteria' (2 pl.).—T. G. Hill, 'Roots of *Bignonia*' (1 pl.). — C. A. Barber, '*Cupressinoxylon vectense*' (2 pl.).—A. J. Ewart, 'Action of Cold and of Sunlight on aquatic plants.' — R. Scott & E. Sargant, 'Development of *Arum maculatum* from seed' (1 pl.).

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[*] The dates assigned to the numbers are those which appearon their covers or title-pages, but it must not always be inferred that this is the actual date of publication.

Ann. Scott. Nat. Hist. (July).—J. W. H. Trail, 'Topographical Botany of Scotland' (cont.: *Rosaceæ—Compositæ*).

Bot. Centralblatt (Nos. 36–39). — H. Barth, 'Über den mikrochemischen Nachweis von Alkaloiden in pharmaceutisch verwendeten Drogen.' — (No. 36). W. Susuki, 'Die Assimilation der Nitrate in Dunkelheit durch Phanerogamer.' — (No. 37). V. F. Brotherus, '*Indusiella*, eine neue Laubmoos-Gattung aus Central-Asien.'—G. S. Wallin, 'Ueber gerbstoffähnliche Tröpfchen im Zellsafte der Bromeliaceen-Blätter.' — (No. 37). E. H. Krause, 'Floristische Notizen.'

Bull. de l'Herb. Boissier (14 Sept.). — L. Blanc & E. Decrock, 'Distribution géographique des Primulacées' (2 pl.). — H. Hallier, 'Bausteine zu einer Monographie der Convolvulaceen' (1 pl.).—F. Crépin, '*Rosa stellata* Wooton.'—H. Schinz, 'Beiträge zur Kenntnis der africanischen Flora' (*Euphorbiaceæ*, F. Pax & H. Schinz; *Anacardiaceæ* & *Sterculiaceæ*, H. Schinz; *Lythraceæ*, E. Koehne; *Compositæ*, O. Hoffmann). — E. A. Wainio, 'Clathrinæ herbarii Mulleri.' — R. Chodat & N. O. Hofman-Bang, 'Sur les microphytes qui produisent la maturation du fromage.' — J. Bornmüller, '*Onobrychis Bellevii.*'—A. Pestalozzi, 'Die Gattung *Boscia*' (concl.).

Bull. Torrey Bot. Club (10 Sept.). — J. K. Small, 'Botany of Southeastern U. S.'—T. C. Porter, 'Flora of Lower Susquehanna.'—H. H. Rusby, 'Plants collected in S. America, 1885–6' (*Vailia*, gen. nov. Asclepiadarum). — J. B. Ellis & B. M. Everhardt, 'New Fungi.'—J. H. Barnhart, *Utricularia macrorhyncha*, sp. n.

Gardeners' Chronicle (27 Aug.). — C. T. Druery, 'Dimorphic Ferns' (fig. 42).—(3 Sept.). '*Cereus peruvianus monstrosus*' (fig. 46).

Erythea (31 Aug.).—J. G. Lemmon, 'Notes on West-American Coniferæ.'

Journal de Botanique ("16 Mai," received 3 Sept.). — E. Bescherelle, 'Enumération des Hépatiques de Tahiti' (concl.).—P. van Tieghem, 'Sur le genre *Penthorum*.' — ("1 Juin," received 3 Sept.). E. G. Camus, 'Plantes hybrides spontanées de la flore européenne' (cont.).—E. Drake del Castillo, 'De la véritable place du genre *Fitchia*' (2 pl.). — —. Hue, 'Causerie sur les *Parmelia*.'

Oesterr. Bot. Zeitschrift (Aug.). — L. Lämmermayr, 'Ueber eigenthümlich ausgebildete innere Vorsprungsbildungen in den Rhizoiden von Marchantiaceen.' — A. Fuchs, 'Ueber den Bau der Raphidenzelle.' — F. Ludwig, 'Biologische Beobachtungen an *Helleborus fœtidus*.' — J. Rick, 'Zur Pilzkunde Vorarlbergs.' — J. Murr, 'Die Piloselloiden Oberösterreichs.'

BOOK-NOTES, NEWS, &c.

The Supplement to Mr. B. Daydon Jackson's *Index Kewensis*, compiled by M. Théophile Durand and Mr. Jackson, is, we understand, actually in the press at Brussels. The unfortunate delay in its issue has been largely due to the illness of M. Durand, who has charge of the work in its complete form; but now that it is in the hands of the printer it is to be hoped that no further delay will ensue. The period covered by the Supplement is from 1886 to 1895 inclusive, a period of great activity in botanic publication, and the large number of names included will make the forthcoming volume of great interest.

We have received the Reports of the Botanical Exchange Club for 1896 and 1897, from which we hope to make some extracts at an early date.

The *Annals of Botany* for September contains an interesting and important paper by Mrs. D. H. Scott and Miss Ethel Sargant, "On the Development of *Arum maculatum* from the seed."

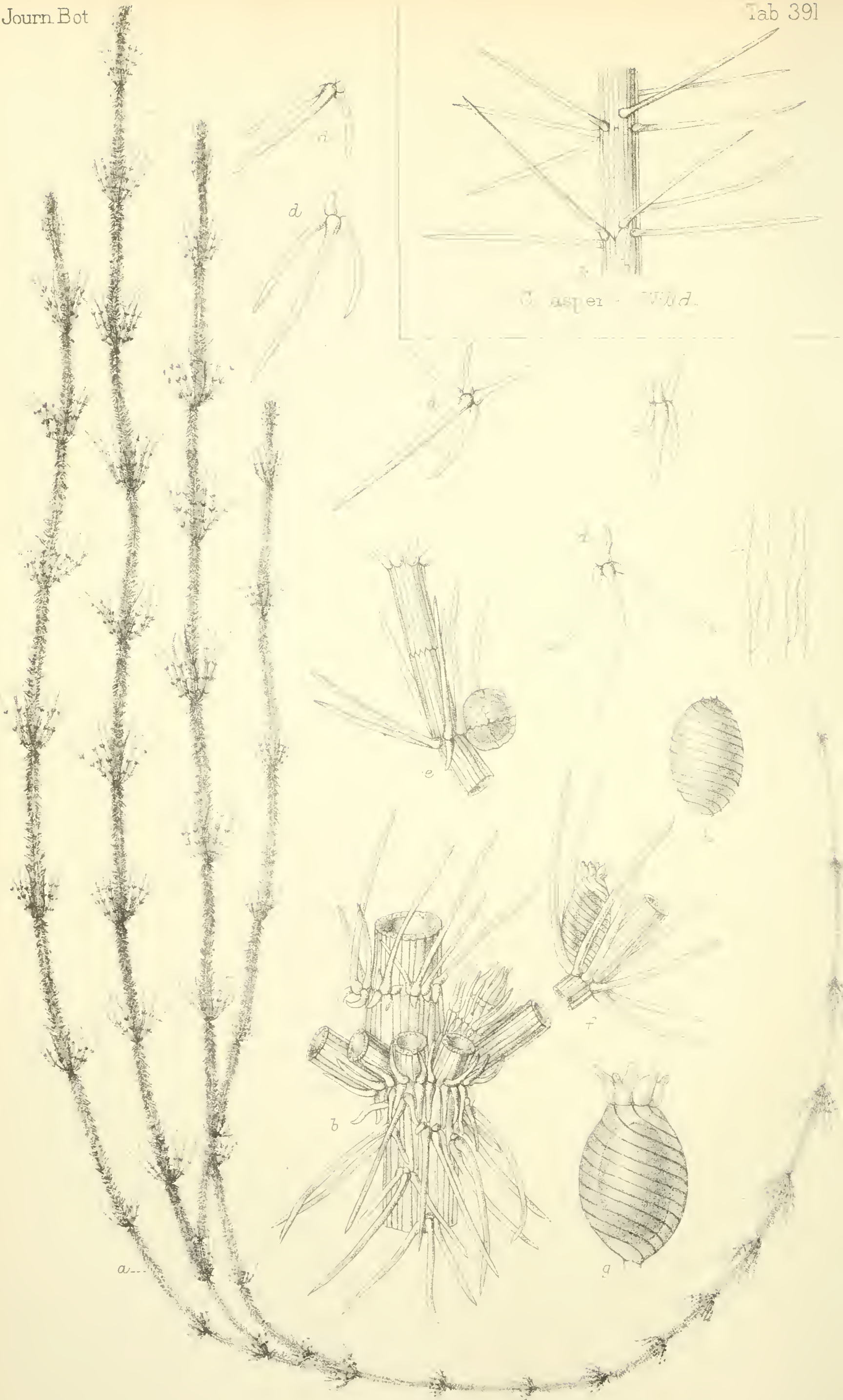
Messrs. Groves have undertaken to edit a new edition of Babington's *Manual*. The book will consist almost entirely of Babington's own work as indicated in his interleaved copy which was "written up" until August, 1891, with the necessary alterations of name and the addition of undoubtedly new species.

We have omitted to notice the handsome volume on *The Yew-trees of Great Britain and Ireland*, by Dr. John Lowe, which Messrs. Macmillan sent us some time since (8vo, pp. viii, 269; price 10s. 6d. net). The author gives a very full account of our historic yew trees, and has ransacked general literature for references to the yew, with interesting results. The chapter devoted to the history and use of bows is one of the most instructive. The botanical account of the varieties of yew might have been a little fuller, and the etymology of the word might have been further elucidated; but the book is an excellent example of its kind, and its attractiveness is much enhanced by some forty admirable illustrations.

We have received a copy of Mr. H. C. Hart's *Flora of Donegal*, which we hope to notice in our next issue.

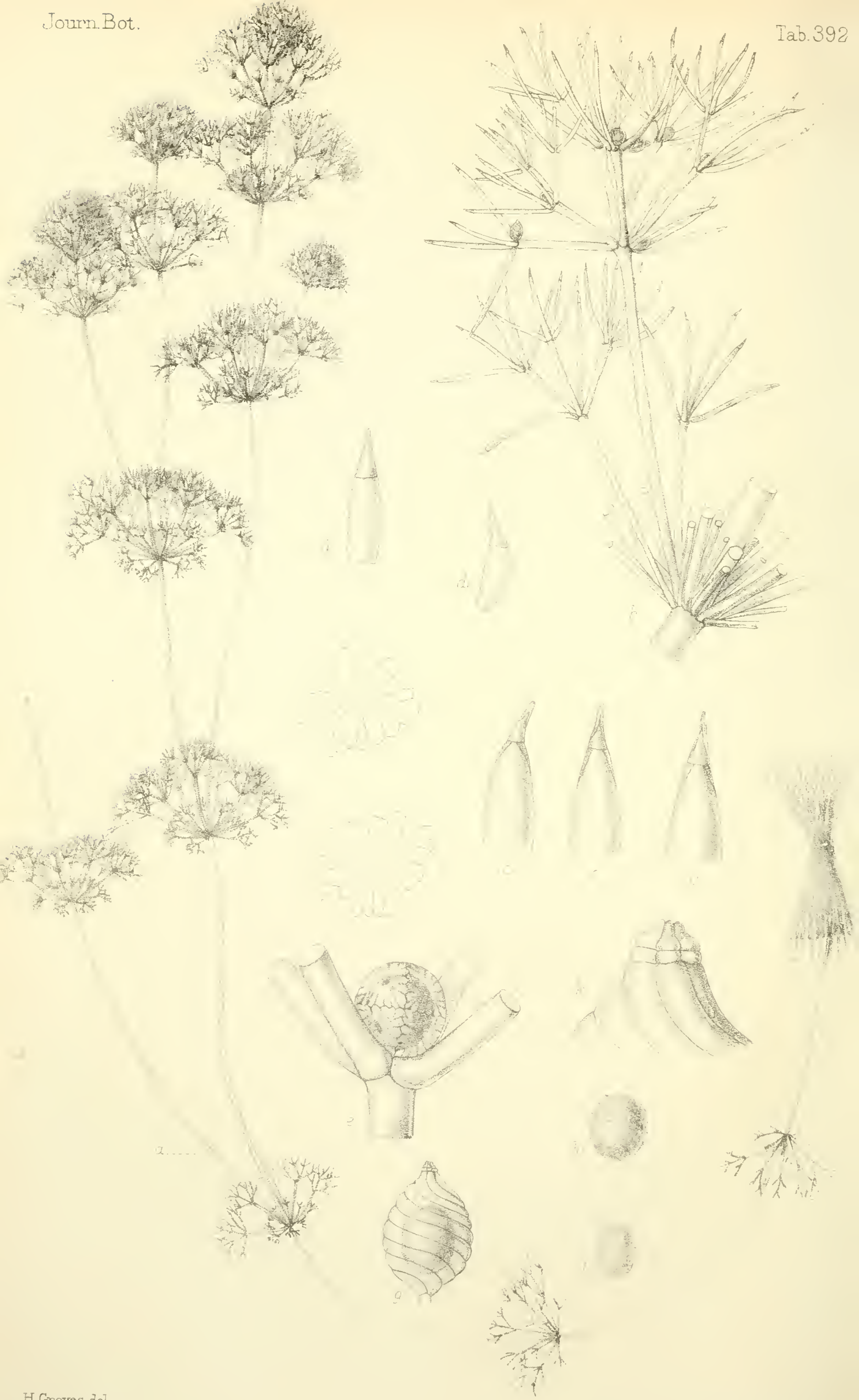
We learn that our contributor Mr. S. T. Dunn has been appointed Secretary to the Director of Kew Gardens.

Those who have gardens and who are not already acquainted with Mr. Robinson's *English Flower Garden* (Murray: royal 8vo, cloth, pp. xii, 832; price 15s.) will do well to secure the new (sixth) edition of this handsome and standard work which has lately appeared. It is not too much to say that the work is encyclopædic; the first part contains the fullest information about the management of gardens of various kinds and at different seasons of the year, with descriptions of various flower gardens scattered up and down the country; the second part gives a descriptive list, alphabetically arranged, of "the flowers, flowering shrubs and trees, evergreens and hardy ferns for the open-air flower garden in the British Isles, for their cultivation and the positions most suitable for them in gardens." Mr. Robinson has done more than any one to bring about a reformation of taste in matters horticultural; and he writes as an enthusiast possessed of common sense. We must not forget to add that the volume is profusely and admirably illustrated; the views of the various gardens described are especially beautiful.


C. aspera, Willd.
c
d
c
d
e
b
f
g
a

M. & H. Groves del.
R. Morgan lith.
West, Newman, imp

Chara aspera, *Willd.*, *subsp* desmacantha, *H & J Groves*.



H. Groves del.
R. Morgan lith.
West, Newman, imp.

Nitella hyalina, *Ag.*

NOTES ON BRITISH CHARACEÆ, 1895–1898.

By H. & J. Groves, F.L.S.

(Plates 391, 392.)

In the present instalment of "Notes" we have the pleasure of describing the most interesting addition to our *Chara*-flora for many years past, *Nitella hyalina*, which has recently been discovered in Cornwall by our friend the Rev. G. R. Bullock Webster, who has done such good work among the *Characeæ* in the eastern counties. There are also some important extensions of distribution to record, notably *Chara connivens* from Ireland, and *C. canescens* from Suffolk and Wexford. As in former years, Mr. R. Lloyd Praeger has furnished us with a very large amount of material, enabling us to fill up many blanks in the Irish counties. Mr. S. M. Macvicar's gatherings in Coll and Tiree have added considerably to our previously scanty records for Mid Ebudes. We are much indebted to the gentlemen already named, and to our other correspondents, who have furnished us with the very numerous specimens, from which the following records are gleaned:—

Chara fragilis, Desv.—Norfolk W., 1897, *G. R. Bullock Webster;* Ayrshire, 1896, *A. Somerville;* Cantire, 1897, *C. E. Salmon;* Cork S., 1896, *R. A. Phillips;* Kildare, Meath, and Louth, 1896, *R. Ll. Praeger,* Roscommon, 1896, *D. McArdle & R. Ll. Praeger.*

Var. barbata.—Devon N., 1895, *W. P. Hiern;* Lincoln S., 1895, *Mason & Peacock;* Clare, 1896, *N. Colgan*; Mayo E., 1895, *E. S. Marshall.*

Var. capillacea.—Cambs, 1896, *G. R. Bullock Webster;* Louth, 1896, *R. Ll. Praeger.*

Var. Hedwigii.—Aberdeen N., 1883, *J. W. H. Trail, comm. A. Bennett.*

Var. delicatula.—Lincs. N., 1894, *Mason & Peacock;* Westerness, 1895, *S. M. Macvicar;* Cantire, 1897, *C. E. Salmon:* South Ebudes, Islay, 1898, *T. F. Gilmour, comm. A. Somerville;* Mid Ebudes, 1896, *S. M. Macvicar;* Meath (1896) and Roscommon (1897), *R. Ll. Praeger;* Tyrone, 1896, *Mrs. Leebody, comm. R. Ll. Praeger.*

C. connivens, Braun.—Suffolk E., near Benacre Broad, 1897, *G. R. Bullock Webster;* Wexford, lagoon north of Wexford Harbour, 1896, *E. S. Marshall.* A very interesting addition to the Irish flora.

C. aspera, Willd.—Norfolk W., Fowlmere, Croxton Heath, 1897, *G. R. Bullock Webster;* Lincs. N., Althorpe, 1894, "*Fowler,*" *comm. E. A. Woodruffe Peacock;* Mid Ebudes, Coll and Tiree, 1896, *S. M. Macvicar.*

Var. subinermis.—Mid Ebudes, Coll, 1896, *S. M. Macvicar;* Cork S., Tralispeen Bog, near L. Hine, 1896, *R. A. Phillips & J. G.;* Wexford, lagoon north of Wexford Harbour, 1896, *E. S. Marshall.*

Having received from time to time a large number of specimens of *C. aspera* from Ireland, and a few from England, in which the spine-cells are more or less fasciculate, instead of solitary, or occasionally geminate, as in the normal forms, we have come to the conclusion that the forms with fasciculate spine-cells may with advantage be grouped together under a new subspecies, as follows:—

Subspecies DESMACANTHA, nobis.—Stem usually considerably thicker than in the type; cortex very imperfectly triplostichous, the secondary cells joining obliquely; cortical nodes more numerous, 14–18 to an internode of the stem; spine-cells usually in groups of 3–5. Tab. 391.

We have been unable to find among the many varietal and specific names which have been given to forms of *C. aspera* one applicable to our subspecies. In addition to the character afforded by the fascicled spine-cells, there seems to be a marked difference in the number of the cortical nodes, the type of *C. aspera* having usually 10–12 to an internode, while the present plant has usually 14–18. It should be explained that in arriving at these figures we have added the number of cortical nodes in an ascending series to that in the descending series most nearly opposite to it. Among the *aspera* forms which we have recently examined, we find specimens referable to this subspecies from Cornwall W., Hayle Kembra, *J. G.*; Norfolk E., Lopham Fen, and Norfolk W., Langmere, *G. R. Bullock Webster*; Cambridge, Burwell Fen, *A. Bennett*; Anglesey, *J. E. Griffith*; and Yorks S.E., Bromfleet, *T. Birks, jun.*; and from Ireland, where it seems to be the prevalent form, from the following counties:—Queen's Co., Kildare, Dublin (the form we referred to var. *capillata*), Meath, Galway E., Tipperary N., King's Co., Westmeath, Mayo E., Sligo, Roscommon, and Down. We also have specimens from several localities in the S. of Sweden, *Nordstedt & Wahlstedt*; and from Bavaria, *Leonhardi*, Braun R. & S. Exsicc. No. 116, var. *curta*. No doubt the examination of a larger number of specimens will show a much more extended distribution.

C. POLYACANTHA, Braun, R. & S.—Norfolk W., Garboldisham, 1897, *G. R. Bullock Webster*; Meath, Oldcastle, 1896, *R. Ll. Praeger*.

C. CONTRARIA, Kuetz.—Suffolk E., near Southwold, 1896, *E. S. & C. E. Salmon*; Mid Ebudes, Tiree, 1896, *S. M. Macvicar*; Meath, Oldcastle, 1896, *R. Ll. Praeger*; King's Co., Edenderry, 1896, *R. Ll. Praeger*; Roscommon, R. Suck, 1896, *D. McArdle & R. Ll. Praeger*; Cavan, L. Sheelin, 1896, *R. Ll. Praeger*; Donegal, near Mulroy Mouth, 1898, *H. C. Hart*.

Var. HISPIDULA.—Westmeath, L. Owel, 1895, *H. C. Levinge*.

C. HISPIDA, L.—Norfolk W., 1897, *G. R. Bullock Webster*; Lincoln N., 1894, *Mason & Peacock*; Cantire (I. of Gigha), 1898, *A. Somerville*; Mid Ebudes (Coll and Tiree), 1896–7, *S. M. Macvicar*; Orkney, 1898, *A. Somerville*; Tipperary S. (1897) and Meath (1896), *R. Ll. Praeger*; Donegal, 1898, *H. C. Hart*.

Var. RUDIS.—Tipperary S., Clonmel, 1897, *R. Ll. Praeger*; Queen's Co., Portarlington, 1896, *R. Ll. Praeger*; Meath, Oldcastle, 1896, *R. Ll. Praeger*; Kildare, Kilcock and Maynooth, 1896, *R. Ll.*

Praeger; Clare, Aranmore, 1891, *S. A. Stewart* (recorded by us in Journ. Bot. 1895, p. 291, by an error, as W. Galway); King's Co., Edenderry, 1896, *R. Ll. Praeger;* Mayo E., S.E. corner of L. Mask, 1895, *E. S. Marshall;* Sligo, Rosse's Point, 1897, *R. Ll. Praeger;* Cavan, L. Sheelin, 1896, *R. Ll. Praeger.*

C. vulgaris, L.—Monmouth, 1892, *W. Whitwell;* Argyll (Lismore), 1898, *S. M. Macvicar;* Mid Ebudes (Coll and Tiree), 1896–7, *S. M. Macvicar;* Tipperary S., 1897, *R. Ll. Praeger;* Wexford, 1896, *E. S. Marshall;* King's Co. (1896), Leitrim (1897), Roscommon (1897), and Cavan (1896), *R. Ll. Praeger;* Donegal, 1898, *H. C. Hart.*

Var. longibracteata.—Hants N., 1895, *C. E. Salmon;* Norfolk W., 1897, *G. R. Bullock Webster;* Argyll (Lismore), 1898, *S. M. Macvicar;* Queen's Co. (1897), Kildare (1896), and Meath (1896), *R. Ll. Praeger;* Clare, 1895, *N. Colgan;* Westmeath, 1895, *E. S. Marshall.*

Var. papillata.—Mid Ebudes, Tiree, 1896, *S. M. Macvicar.*

C. canescens, Loisel.— Suffolk E., near Southwold, 1896, *E. S. & C. E. Salmon;* Wexford, large lagoon N. of Wexford Harbour, 1896, *E. S. Marshall.* Both of these records represent important extensions in the distribution in this country of this species, which had hitherto only been found in W. Cornwall, Dorset, and N. Kerry.

Tolypella glomerata, Leonh.—Wexford, large lagoon N. of Wexford Harbour, 1896, *E. S. Marshall;* Galway E. and Tipperary N., L. Derg, 1896, *N. Colgan.*

T. prolifera, Leonh.—Berks, R. Isis near Oxford, 1896, *G. C. Druce;* Oxford, Kidlington, 1896, *G. R. Bullock Webster;* Norfolk E., near Gillingham Marsh, Beccles, 1897, *G. R. Bullock Webster;* Norfolk W., Little Ouse, near Brandon Creek and St. John's, Southery Drain, &c., 1897, *G. R. Bullock Webster.*

Nitella hyalina, Agardh, Systema Algarum (1824), p. 126 (*ex parte*). Kuetzing, Phyc. Germ. (1845) p. 256; Sp. Alg. (1849) p. 516; Tab. Phyc. vii. (1857) p. 14, tab. 35, fig. 2. Braun, Schweiz. Char. (1847) p. 10; Monatsb. Akad. Berl. 1867 (1868), p. 817; Fragm. Monog. Char. (1882) p. 78. Rabenh. Deutsch. Krypt. Flor. (1847) p. 196. Wallm. Act. Acad. Stockh. 1852 (1854) p. 244. Nordstedt, Bot. Notiser, 1863, p. 39. Leonhardi, Oesterr. Arml. Gewächse (1864), p. 55. Wahlst. Mon. Sver. & Norg. Char. (1875) p. 20. Sydow, Europ. Char. (1882) p. 31, Migula in Rabenh. Krypt.-fl. ed. ii. vol. v. part 3 (1890) p. 190. fig. 55–57; Syn. Char. Europ. (1898) p. 49, fig. 43–45.

Chara hyalina, DC. Flore Française (1815), vol. vi. p. 247 (*ex parte*). Braun, Ann. Sci. Nat. 1834, p. 351; Regensb. Bot. Zeit. 1835, i. p. 54.

C. condensata and *C. interrupta*, Rupr. Symb. ad Hist. Pl. Ross. 1845, p. 78 (*fide* Braun).

Exsiccata:—Braun, R. & S. Char. Europ. 21, 31, 107. Nordst. & Wahlst. Skand. Char. 18. Rabenh. Alg. Sachs. 419. Desmaz.

Pl. Crypt. Fr. ii. 324. Lloyd, Alg. Ouest Fr. 401. Wartm. & Schenk, Schweiz. Krypt. 250. Jack, Lein. & Stizenb. Krypt. Bad. 205.

A rather small plant. Stem about ·30–·48 mm. thick. Internodes 2–4 times the length of the branchlets. Whorls of usually 8 primary branchlets with about double that number of smaller secondary branchlets in two series, the one above and the other below the primary branchlets. Primary branchlets 2–3 times divided, the primary rays $\frac{1}{2}$–$\frac{3}{5}$ the total length of the branchlets. Rays at the first forking 7–10 (of which 1–3 are usually simple); at the second forking 4–7, of which 0–2 are again divided into 4–5 quaternary rays. Ultimate rays 2-celled, apical cell ·09–·14 mm. long, ·03–·045 broad at the base. Secondary branchlets usually one above and one below each primary branchlet, those of the lower series usually once or twice divided into 4–6 rays, those of the upper usually once divided into 5 rays, or simple. Fruits solitary, occurring on the primary branchlets at the second and third and more rarely at the first forkings, sometimes on the secondary branchlets also, ·5–·62 mm. long, ·38–·41 thick, showing 9–10 striæ; coronula ·075 mm. broad, ·045 high; oospore (unripe) brown, decidedly flattened, about ·28 mm. long, ·26 thick in the broader diameter, ·18 in the narrower. Antheridia occurring at all the forkings, though less commonly at the first, ·35–·42 in diameter. Monœcious.

An extremely beautiful plant, at once distinguished from all the other British species by the presence of the secondary branchlets, being the only European representative of Braun's section *Diarthrodactylæ, heterophyllæ.* The English plant is a large lax form, which would be included in Braun's var. *maxima*, though more slender than the Bayonne plant. The species is world-wide in its distribution, occurring almost throughout Europe, in Asia, Africa (N, and S.), N. America, and Australasia. It was discovered in Britain in August of the present year by the Rev. G. R. Bullock Webster, growing in some quantity on thick mud in 4–5 feet of water, in The Loe, a lake separated from the sea by a narrow sandbar, near Helston, West Cornwall. Tab. 392.

N. TENUISSIMA, Kuetz.—Norfolk E., Lopham Great Fen, 1897, *G. R. Bullock Webster.* This is a very satisfactory record, Lopham being in the same group of fens as Roydon Fen, and we think there is little doubt that Borrer's specimen labelled Roydon Fen, Cambs, was really collected in East Norfolk.

N. MUCRONATA, Kuetz.—Norfolk W., Little Ouse, near St. John's, 1897, and Cambs, Roswell Clay-pits. Ely, 1895, *G. R. Bullock Webster;* Beds, R. Ivel, near Sandy, 1891, *J. Saunders.*

N. TRANSLUCENS, Agardh.—Bucks, Burnham Beeches, 1897, *G. C. Druce;* Mid Ebudes, Loch-na-Gile, Tiree, 1896, *S. M. Macvicar;* Cork S., Shepperton Lakes, 1896, *J. G.*

N. FLEXILIS, Agardh.—Hants S., Darkwater, near Exbury, 1895, *J. G.;* Bucks, Brickhill, 1897, *G. C. Druce;* Salop, Longmynd, 1897, *W. Hunt Painter.*

N. OPACA, Agardh.—Worcester, 1897, *R. F. Towndrow;* Lincoln N., 1895, *Mason & Peacock;* Mid Ebudes (Tiree), 1896, *S. M. Macvicar;* Carlow (1897) and King's Co. (1896), *R. Ll. Praeger;* Westmeath, 1895, *H. C. Levinge;* Mayo E., 1895, *E. S. Marshall;* Galway E., 1896, *D. McArdle & R. Ll. Praeger;* Roscommon (1897) and Cavan (1896), *R. Ll. Praeger*.

EXPLANATION OF PLATE 391.—*a. Chara aspera*, Willd., subsp. *desmacantha*, H. & J. Groves, from Brittas Lake, Westmeath: plant natural size. *b.* Portion of stem with node × 15. *c.* Cortex showing oblique joinings of secondary cells × 60. *d.* Clusters of spine-cells × 15. *e.* Node of branchlet with antheridium × 15. *f.* Ditto, with fruit × 15. *g.* Fruit × 30. *h.* Oospore × 30. *i.* Group of spine-cells on specimen from Money Lake, Downpatrick × 15. *k.* Portion of stem of *C. aspera* type, from Frensham, Surrey × 15.

EXPLANATION OF PLATE 392.—*a. Nitella hyalina*, Agardh, from The Loe, West Cornwall; plant natural size. *b.* Portion of whorl showing a primary and upper and lower secondary branchlets × 7½. *c.* Apices of terminal rays × 60. *d.* Young ditto × 60. *e.* Node of branchlet with antheridium × 30. *f.* Plates of antheridium × 60. *g.* Fruit × 30. *h.* Unripe oospore, broadest view × 30. *i.* Ditto, narrowest view × 30. *k.* Apex of fruit, showing coronula × 140.

NOTES ON HOYA.

BY JAMES BRITTEN, F.L.S.

THE following notes were made during a revision of the genus *Hoya* as represented in the National Herbarium, and may be worth placing on record. They show, what by this time should need no demonstration, that those engaged in colonial floras or other systematic work would find it to the interests of science and to their own advantage to consult the material preserved in the British Museum.*

HOYA ACUTA Haworth.

This plant stands in the *Index Kewensis* and in the *Flora of British India* as *H. parasitica* Wall.; but the synonymy given by James Traill (who first published Wallich's name, under which he had sent the plant to Kew, in his important paper on the genus in Trans. Hort. Soc. vii. 16–30 (1827))† makes it evident that Haworth's name must stand, unless the permanence of the first specific name be maintained. Traill's synonymy, to which I have added dates, runs thus:—

"H. acuta, *Haworth Rev. Plant. Succ. p.* 4 [1821].
H. lanceolata, *Lindley in Don's Cat. edit.* ii. *p.* 92 [1826].
H. pallida, *Lindley in Bot. Reg. vol.* 11, *folio* 951 [Feb. 1826].
H. albens? [John] *Miller's* (*Bristol*) *Cat.* 1826."

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* Thus in the next genus to this in Fl. Brit. Ind., Sir Joseph Hooker says: "*Dischidia clavata*, Wall. Cat. 4209, is unknown to me; I have not found it in Wallich's Herbarium at the Linnean Society." But the number is in the British Museum Herbarium.

† This paper is cited as of 1830 in Ind. Kewensis, but the part of the volume which contains it was published in 1827.

Traill's note upon these names, which it seems hardly necessary to reproduce, makes it clear that Haworth's name was given to the actual plant sent by Wallich.

Mr. Jackson cites John Miller's name as "*albens* Millers. ex Steud. Nom. ed. ii. i. 177 [777]" (1841), but it should stand as above, on Traill's authority, and dates from 1826.

HOYA AUSTRALIS Br.

This name, first published by James Traill in Trans. Hort. Soc. vii. 28 (1827), was (as there stated) referred by Brown in Mem. Wern. Soc. i. 27, and subsequently in his *Prodromus*, to *H. carnosa*. In each case, however, Brown expressed his opinion that his *carnosa* probably included several species; it appears from his MSS. that he grouped under that name all the specimens he had seen that did not belong to *viridiflora* (= *Dregea volubilis*)—the second species of the genus as originally constituted by him. Subsequently the Australian plant was named by him in Herb. Banks. *H. australis*, and as his ticket upon the same sheet bears the name *H. carnosa*, the doubt expressed by Bentham (Fl. Austr. iv. 347) as to the identity of the two plants may be removed.

The plant does not seem to have been collected by Brown, as stated by Bentham, but only by Banks, at Cape Grafton, Endeavour River, in 1770. It was named and fully described in MS. by Solander, and we have also a sketch by Sydney Parkinson, from which James Miller subsequently prepared a finished drawing which was engraved but not published.

To the same species (under its synonym *H. bicarinata* A. Gr.) Seemann (Fl. Vit. 163) correctly referred *Asclepias volubilis* of George Forster's *Prodromus* (p. 21, excluding the synonymy) from Tanna, on the faith of his sketch (dated "Tanna, August 12th, 1774") and finished drawing. There is a Tanna specimen in the Banksian Herbarium from Captain Cook, collected during the same voyage, to which Seemann makes no reference, though it is obvious that he saw it.

To *H. carnosa* Brown also (Mem. Wern. Soc. i. 27) referred a plant of Loureiro's which he cites as "Stapelia Chinensis, Lour. Cochin. i. p. 205, fide specim. ab auctore missi in Herb. Banks." The only specimen of "Stapelia" from Loureiro in Herb. Banks. is named *S. cochinchinensis*, so it seemed clear that this was the name Brown had intended to cite. Having arrived at this conclusion, I found I had been anticipated by Traill (*l. c.* 20), who gives a very careful note, based on an examination by Brown, showing that Loureiro's specimen cannot be identified, save in part, with either of his descriptions, and that both remain obscure.

HOYA NICOBARICA Br.

Sir Joseph Hooker (Fl. Brit. Ind. iv. 62) places this among his "doubtful and excluded species" with the following note: "*H. nicobarica* Br. in Wight Contrib. 36 (note under *H. pendula* W. & A.)—Nothing is known of this." This statement is the more remarkable because it is distinctly stated in Wight's *Contributions* that a specimen named by Brown was then in the Banksian Herbarium, where it is still to be found. It appears to be different from any species included in Fl. Brit. Ind., and as only Traill's brief characterization (*l. c.* 28) has hitherto appeared, it may be well to append the following full description, which has been drawn up by Mr. Hiern from Brown's specimen and from his MSS. :—

Hoya nicobarica R. Br. ex Traill in Trans. Hort. Soc. vii. part 1, p. 28 (1827), and in Herb. Banks! Stem rather slender, suffruticose, rooting, obtusely quadrangular, glabrous; leaves oval-ovate, pointed or acuminate at the apex, obtuse or nearly rounded at the base, glabrous, glaucescent, fleshy-coriaceous, 2–4 in. long by 1–2 in. broad, the margins narrowly revolute, the lateral veins slender, 5–7 on each side of the less slender midrib, the base not conspicuously trinerved; petiole stout, glabrous, $\frac{1}{3}$–$\frac{1}{2}$ in. long, usually bent at or near the apex; flowers about $\frac{1}{3}$ in. in diameter when fully expanded, arranged in "beautiful globose umbels" of $1\frac{1}{2}$–2 in. in diameter; axillary peduncles about 1 in. long, nearly glabrous, persistently thickened towards the bracteolate apex, where they give off a succession of numerous pedicels; the terminal peduncles abbreviated, with similar tips; pedicels slender, nearly glabrous, about $\frac{2}{3}$ in. long; bracteoles very short, somewhat puberulous, numerous; calyx 5-partite, short; the segments equal, ovate-oval, obtuse, minutely apiculate, slightly glandular-puberulous on the back, ciliolate, $\frac{1}{20}$ in. long, membranous, flat; corolla 5-cleft, the tube scarcely longer than the calyx, cyathiform; the lobes triangular-ovate, reflected, $\frac{1}{10}$ in. long, very shortly puberulous outside, glandular-puberulous inside; corona inserted at the apex of the tube of filaments; the scales 5, divaricate, a little ascending, $\frac{1}{12}$ in. long, rather thick, cartilaginous-fleshy, lanceolate, marked down the lower part of the back with a longitudinal furrow, angular towards the subacute not splitting apex, furnished inside near the base with a short spur; staminal tube short; filaments closely connate; anthers connivent, concealed by the corona, the apical membranous appendages exserted.

"Nicobar Isles? Soc. unitat. Fratr., 1785," n. 136.

There is also in Herb. Banks. a specimen labelled "Malacca, Mr. Robertson, gathered Sept. 1772," of which Brown in his MSS. says, "Flos omnino ut in planta nicobarica." The specimen is poor, but Mr. Hiern has examined a flower, and considers it allied to, if not identical with, *H. nicobarica* Br.

Hoya pendula.

Sir Joseph Hooker retains this name for the plant figured in Wight's *Icones* (vol. ii. t. 474),* in favour of which he rejects the earlier *H. pendula* of Wight's *Contributions*, p. 36 (not later than 1834), to which he gives the name *H. Wightii*. There has undoubtedly been confusion with regard to these plants, and it may be worth while to put on record the conclusions at which Mr. Hiern and I have arrived.

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* The title-page of this volume bears the date 1843, but there is reason to believe that the part containing the plate did not appear later than 1841.

The name originated with the *Asclepias pendula* of Roxburgh, who published it in *Hortus Bengalensis*, p. 85 (1814), and (with description) in Fl. Indica, ii. 36 (1832).* There is in the National Herbarium a specimen named by Roxburgh and sent by him to Banks in 1813, which J. J. Bennett considered identical with *H. nicobarica;* from which it differs by large flowers with the scales of the staminal corona rather obtuse and splitting at the tip, thinly pubescent pedicels, and somewhat larger leaves which are rather conspicuously three-nerved at the base. This agrees with the description in the *Contributions*, as well as with that of the *Icones*, which seems mainly a transcription, but it is not the plant there figured (from a Roxburgh drawing).

The only specimen seen by Sir Joseph Hooker which he refers to *H. pendula* was "an unnamed one in Wight's Herbarium." which, being unnamed, is not typical for Wight's species.

It is evident from the date of publication that the plant of the *Contributions* must retain the name *pendula*, and that this, in spite of Sir Joseph Hooker, must be the *pendula* of the Fl. Brit. India, for it certainly is that of Roxburgh's Fl. Indica. The figure in Wight's *Icones* should, it seems to us, be referred to *H. Wightii*—a name now to be retained for this and for the "Hoya No. 27" of the Hooker & Thomson distribution, on which the description seems to be based.

The synonymy of the two species will stand as follows:—

HOYA PENDULA W. & A., Contrib. p. 36 (1834), and Wight Ic. ii. part ii. p. 4, excl. tab.
  Asclepias pendula Roxb. Fl. Ind. ii. 36, and in Herb. Banks.

HOYA WIGHTII Hook. f. in Fl. Brit. Ind. iv. 59, quoad "Hoya n. 27, Herb. Ind. Or. H. f. & T.," excl. syn.
  Hoya pendula Wight Ic. t. 474, excl. descript.; Hook. f. in Fl. Brit. Ind. iv. 61.
  Asclepias pendula Roxb. Ic. ex Wight & Hook. f., ll. cc.

Sir Joseph places the vars. *Rheedei* and *Neelgherrense* of *H. pendula* W. & A. under *H. Wightii*, and says that they are "not distinguishable." The former, however, is based by Wight on *A. pendula* Roxb. and upon Rheede's plant, and so far as the former goes must be regarded as the type of the species. The latter is identified by Wight himself (*l. c.*) with "*H. revoluta* Wight! in Wall. Herb. Soc. Linn.," which Sir Joseph retains as a distinct species, citing it as of "Wight MSS." The reference to the name in *Contributions* seems to have been overlooked in *Index Kewensis*, where it stands as of "Wight ex Decne. in DC. Prod. viii. 636."

HOYA CRASSIFOLIA Haw. Suppl. Pl. Succ. p. 8 (1819). Sir Joseph Hooker (*l. c.* 62) says that this name "would supersede"

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* The figure cited by him from Rheede (Hort. Malab. ix. t. 13) and by subsequent authors does not seem to belong to this species.

H. carnosa Br. if the two plants were identical, but this can in no sense be accurate, inasmuch as *H. carnosa* was the first species placed by Brown in his genus *Hoya*, and is the *Asclepias carnosa* of Linn. fil. (Suppl. 170 (1781)). Traill (*l. c.* 22) considers Haworth's plant different from *H. carnosa* (the *Schollera crassifolia* of Jacquin, *Eclogæ*, p. 5, t. 2), but flowers were not known, and it is no doubt correctly referred to *H. carnosa.*

Hoya purpurascens stands in Ind. Kew. as of "Teijsm. & Binn. Cat. Hort. Bog. 385 (nomen)." But it was previously described by the same authors in Tijdschr. Ned. Ind. xxv. 408 (1863). The word "nomen" should be added to the Ind. Kew. citation from Cat. Hort. Bog. for *H. ciliata* T. & B.

H. Cunnighami (*sic*) is given by Teijsmann & Binnendyck (in Tijdschr. Ned. Ind. xxv. 408, and in Cat. Hort. Bogor. 130) as a name under which *H. excavata* had been cultivated in the Utrecht Garden. It is not in Ind. Kew.

H. pilosa Seem. is retained in Ind. Kew. as a species, but can hardly be said to have any claim to that position. It first appeared in *Bonplandia*, ix. 257, as a *nomen nudum*, and in Fl. Vit. 163, Seemann says it was "probably only a young state" of *H. bicarinata* (*australis*), "having the leaves more hairy below."

It may be well to append to these notes a full description—drawn up by Mr. Hiern from a series of specimens which form part of the collection lately made in Christmas Island for the British Museum by Mr. C. W. Andrews—of the plant briefly diagnosed by Mr. Hemsley in Journ. Linn. Soc. xxv. 355, as Hoya Aldrichii :—

"Frutex volubilis, totus fere glaber atque carnosiusculus; caule elongato, in vivo terete, tenaci, parce ramoso; ramis tenuibus, interdum intertextis; succo copioso, lacteo; foliis oppositis, ovatis, apice acuminatis cuspidatisve, basi subrotundatis, glabris, carnoso-coriaceis, planis vel prope apicem decurvis, 8–12 cm. longis, 4–5·5 cm. latis, super læte viridibus, infra admodum pallidis, basi 5-nerviis, nervis lateralibus minus conspicuis; petiolo crasso, patulo, 6–12 mm. longo, plus minus curvo, laminæ perpendiculari; pedunculis uniaxialibus, rectis, firmis, 2·5–11 cm. longis, prope basim sæpe quasi-articulatis, nonnunquam puberulis, apice umbelliferis; pedicellis numerosis, ad 50 in umbellâ globosâ, 12–25 mm. longis, rectis vel prope basim flexis, secus pedunculi apicem subelongantem dispositis; floribus pentameris; calyce profunde lobato, 5 mm. diam., ad corollæ basim appresso; lobis ovatis, obtusi, valde ciliatis; corollâ albâ vel pallide violaceâ, carnosâ, sub anthesin recurvâ; lobis ovato-deltoideis, acutis vel apiculatis, super pubescentibus, infra glabris, minute ciliolatis, 5–6 mm. longis; coronâ pallide violaceâ vel purpurascente colore quam is corollæ intensiore, prominente, carnosâ, 6 mm. diam.; segmentis substellatis, glabris, oblique ovoideo-conicis; carpellis fructiferis solitariis, tenuibus, subglabris, 12–17 cm. longis, basi calyce immutato suffultis; seminibus numerosis, apice in comâ albidâ c. 2·5 cm. longâ disinentibus.

"Habitat in Oceani Indiani insulâ *Christmas*, frequens supra rupes et in arbores reptans vel subscandens, dein in sertis floridis densis pendens; legit *C. W. Andrews*, No. 1293, Dec. 1897 et Jan. 1898 cum floribus et fructibus."

The following is a revision of the nomenclature in *Index Kewensis*, so far as the species referred to in these notes are concerned:—

acuta Haw. Rev. Pl. Succ. 4 (1821).
albens John Miller ex Traill in Trans. Hort. Soc. vii. 23 (1827) = acuta.
carnosa Br. in Mem. Wern. Soc. i. 27 (1809).
carnosa Br. *l. c.*, in part; Prodr. 460 (1810) = australis.
chinensis Traill, *l. c.* 27, pl. dub.
cochinchinensis Schult. Syst. vi. 52 (1820), pl. dub.
crassifolia Jacq. ex Traill, *l. c.* p. 23 = carnosa.
Cunnighami Teijsm. & Binn. in Tijdschr. Ned. Ind. xxv. 408 (1863) = excavata.
lanceolata Lindl. in Donn Cat. Hort. Cantab. ed. xi. 92 (1826) = acuta.
pallida Lindl. in Bot. Reg. xi. 951 (1826) = acuta.
parasitica Wall. ex Traill, *l. c.* 23 = acuta.
pendula Wight & Arn. Contrib. 36 (1834).
pendula Wight Ic. 474 (excl. descript.) = Wightii.
pilosa Seem. in Bonplandia, ix. 257 (1861) & Fl. Vit. 163 (nomen) = australis.
purpurascens Teijsm. & Binn. in Tijdschr. Ned. Ind. xxv. 408 (1863).

THE FLOWERING PLANTS OF NOVAYA ZEMLYA, ETC.

By Colonel H. W. Feilden.

(Continued from p. 396.)

23. D. REPENS Bieb. Is common around Habarova, on Dolgoi Island, and widely dispersed over Waigats; not observed by me on Novaya Zemlya, though found on the south end of that island by Mr. Theodor Holm. Apparently it does not extend beyond 71°. Its manner of growth is singular—always in moss; the flower and leaves appear through the moss, but the plant stems ramify horizontally as runners for a great length.

24. D. HIRTA L., type, and its var. *rupestris* Hart. Around Habarova, abundant over Waigats, common on Novaya Zemlya, but not included in my collections from Lutke Land.

25. D. FLADNIZENSIS Wulf. A widely spread species from the mainland of Arctic Russia, to 74° 25′ N. Dolgoi Island; Habarova; Dolga Bay; north end of Waigats; Kostin Shar; South Goose Land; Beluga Bay, Lutke Land; and Ziwolka Fiord.

26. D. MURICELLA Wahlenb. Apparently a scarce plant, for it is not easy to confound this with any other species of *Draba*. Only

found by me on the north end of Waigats at an elevation of 200 ft., where it was growing abundantly on the summit of a range of hills. In Novaya Zemlya, at Neckwatowa. Not found or overlooked by me in Lutke Land.

27. Viola biflora L. Only met with in one locality—the east side of Dolga Bay, island of Waigats, on the 8th July, 1897. It was growing in peaty soil in great abundance and in full flower.

28. Silene acaulis L. Universally distributed, from the mainland of Arctic Russia to Lutke Land, as far as explored in lat. 74° 25′ N.; Habarova; Dolgoi Island; Waigats; Novaya Zemlya; Beluga Bay, Lutke Land; Pachtussow Islands.

29. Wahlenbergia apetala Fries. Scores of specimens of this plant were gathered from various localities, with the object of elucidating the intergrading of this species with the next. The conclusion I arrived at is that *W. apetala* is distinctly a plant of the damp tundra-ground, affecting wet peaty ridges and bogs, *W. affinis* the plant of the dry or rocky ground. *W. apetala* is an abundant species around Habarova, on Dolgoi Island, all over Waigats, and Novaya Zemlya, in suitable localities, growing freely in Lutke Land; at Beluga Bay specimens were gathered in flower ten inches in height. It was common on the Pachtussow Islands and in Ziwolka Fiord.

30. W. affinis Vahl. As already mentioned, this plant, as far as my observation goes, is confined to dry situations, and grows even in the clefts of rocks. By no means so common as *W. apetala*, its areal distribution is much the same. There are specimens in the collection from Dolga Bay; Cape Greben, islands in Kostin Shar, and from Ziwolka Fiord, 74° 25′, a very considerable extension of its previously recorded northern range in this area.

31. Stellaria longipes Goldie. A very common plant over the entire area visited. Habarova; Dolgoi Island; Cape Greben; Cape Matiusela; Neckwatowa; Goose Land; Nameless Bay; Gubina Bay; Beluga Bay, Lutke Land; Ziwolka Fiord.

32. S. humifusa Rottb. This appears to be entirely a maritime plant, growing in spots where there is a suspicion of sea-water rising over the land at times. I found it not uncommon on Dolgoi Island, the shores of Waigats, and Goose Land of Novaya Zemlya; not extending to or overlooked by me in Lutke Land.

33. Cerastium alpinum L. formæ *lanatum*, *hirsutum* et *cæspitosum*. An abundant and generally dispersed plant, from the mainland of Arctic Russia to the northernmost point visited in Lutke Land. The three tolerably distinct forms, to which the many specimens brought back are referred, are not confined to any particular area, but intermingle; it would be difficult to decide which is the predominant type. Specimens from Dolgoi Island are considered f. *hirsutum* Koch, from Habarova f. *cæspitosum* Malmgren; whilst from the Pachtussow Islands we get f. *hirsutum*, and from Ziwolka Fiord, 74° 25′, both *cæspitosum* and *lanatum* Wg. The various localities on Waigats, Novaya Zemlya, and Lutke Land, from which

specimens of the different forms were brought, are too numerous to record.

34. Alsine biflora L. Rare or else overlooked by me. In my collection it appears only from the south coast of Waigats, from Neckwatowa, and from Beluga Bay, Lutke Land, at an altitude of 100 ft.

35. A. imbricata C. A. M. An addition to the flora of the Novaya Zemlya group. Found in only one locality, but there in considerable quantity—the east side of Beluga Bay, Lutke Land, in a broad watercourse at an altitude of 100 ft. This plant has long fibrous roots, stretching several feet amongst the sand and under the stones, and without this faculty of anchoring itself the plant could not exist where we found it, for in the first part of the thaw the flat of the watercourse must be covered with a deluge of snow and water and hurtling rocks. I noticed that many of the plants had been washed out, in spite of their immense development of root. The flower measures three-quarters of an inch across.

36. A. rubella Wahlenb. (*Arenaria verna* L.). A not uncommon plant, generally growing on dry and exposed spots. Cape Greben; Dolga Bay; Nameless Bay, 200 ft.; and Beluga Bay, Lutke Land, 100 ft.

37. Arenaria ciliata L. A common plant on Dolgoi Island, around Habarova, and near the sea-shores of Waigats, especially affecting the summits of wind-tortured islets, where amongst the splintered slates it grows in little bosses covered with white bloom, along with a few scattered plants of *Cerastium*, *Artemisia borealis*, *Papaver*, and *Eritrichium*. Found on Goose Land of Novaya Zemlya, but not included in my collections from Lutke Land.

38. A. peploides L. On the sea-shore in the neighbourhood of Habarova, and at Cape Voronoff, on the north of Waigats. Not included in my collections from Novaya Zemlya or Lutke Land, though found by Mr. Theodor Holm on the south coast of Meshdvsharsky Island.

39. Sagina nivalis Fries. Only brought by me from one locality, Nameless Bay, 100 ft.; probably overlooked at other stations.

40. Hedysarum obscurum L. An abundant plant on Dolgoi Island, equally so on the tundra around Habarova; generally distributed over Waigats in suitable spots, preferring dry ground and sheltered places under the lee of rocks. Islands in the lake of Neckwatowa; islands in Kostin Shar. On Aug. 10th I found it growing abundantly and in full flower at Silver Bay, Lutke Land.

41. Astragalus alpinus L. A very commonly dispersed plant over Waigats, Novaya Zemlya, and Lutke Land. In flower at Ziwolka Fiord, 74° 25′ N., on Aug. 7th, 1897.

42. A. frigidus A. Gray (*Phaca frigida* L.), forma *littoralis* Hook. Not rare around Habarova, but not met with on Dolgoi Island. Abundant on Waigats, where it grows in dry and sheltered spots from the sea-shore to the summit of the ridges, 250 ft. In Novaya Zemlya, common around the lake of Neckwatowa, and on islands in

Kostin Shar. In Lutke Land, around Beluga Bay, from shore-line to 100 ft.

43. Oxytropis campestris D.C. var. *sordida* Willd. A universally distributed plant over Waigats, Novaya Zemlya, and Lutke Land. It affects dry situations. Plentiful and in flower on the Pachtussow Islands, Aug. 6th; and in Ziwolka Fiord, Aug. 7th.

44. Rubus Chamæmorus L. Common on peaty soil around Habarova, also on Dolgoi Island. Grows in profusion in peaty ground on the tundra of Waigats. Obtained in South Goose Land, but not observed by me in Lutke Land.

45. Comarum palustre L. Neighbourhood of Habarova. Common around meres on the island of Dolgoi; also on Waigats, but not observed by me in Novaya Zemlya or Lutke Land.

46. Potentilla fragiformis Willd. This is a widely spread and common plant, extending from the shores of the mainland of Arctic Russia to the farthest north reached in Lutke Land. Habarova; Dolga Bay; Neckwatowa; Rogatcheva Bay; islands in Kostin Shar; Nameless Bay; Beluga Bay, Lutke Land; and Ziwolka Fiord.

47. P. pulchella R. Br. (*P. sericea* Graham non L.). Only appears in the collection from Beluga Bay, Lutke Land; altitude 100 ft.

48. P. nivea L. An addition to the flora of Novaya Zemlya; only identified and gathered at one station, namely, Gubina Bay, where it grew abundantly at an altitude of 300 ft., the plants attaining a height of eight inches.

49. Dryas octopetala L. One of the most common of plants, and generally distributed. Very abundant on Dolgoi Island; all over Waigats, from the sea-shore to the highest ridges; common around Habarova; all over Novaya Zemlya and Lutke Land; found flowering on the Pachtussow Islands, 74° 24′ N., on Aug. 6th, 1897.

50. Hippuris vulgaris L. Common in meres on Dolgoi Island; also at Cape Voronoff, Waigats, but not observed by me in Novaya Zemyla or Lutke Land.

51. Saxifraga oppositifolia L. This universally distributed arctic plant is not so abundant as in some parts of the Polar world, notably Grinnell Land. However, it shares with three other plants, viz. *Papaver nudicaule*, *Cerastium alpinum*, and *Dryas octopetala* var. *integrifolia*, the position of growing in the most northern land yet reached by man, having been obtained at Lockwood Island, 83° 24′ N., by Lieut. Lockwood, of the Greely Expedition. By no means common on Dolgoi Island; found in the neighbourhood of Habarova; generally distributed over Waigats, among rocky areas; the same in Novaya Zemlya; not uncommon about Beluga Bay, Lutke Land, where it reached an altitude of 850 ft.; on the Pachtussow Islands, 74° 24′ N.

52. S. flagellaris Willd. Not observed on Dolgoi Island, nor on the tundra of the mainland of Russia around Habarova. Though carefully looked for, not observed by me on the island of Waigats. In Novaya Zemlya it is a commonly distributed plant, likewise over

Lutke Land. In the neighbourhood of Beluga Bay, 73° 20′ N., this plant grew with great vigour on gravel beaches at 100 ft. altitude, the diameter covered by the radiating stolons of individual plants measuring as much as nine and ten inches. It grows abundantly on the Pachtussow Islands, 74° 24′. It is among the plants that extend their range nearest to the Pole, and I found it to be one of the commonest in Grinnell Land between the 82° and 83° N. lat.

53. S. AIZOIDES L. Common on Dolgoi Island, found in the neighbourhood of Habarova, local but abundant on Waigats, the same in Novaya Zemlya and Lutke Land. Habarova; Dolgoi Island; south shore of Waigats; Nameless Bay; Beluga Bay, Lutke Land; and Silver Bay.

54. S. HIRCULUS L. This is the most widely distributed and commonest plant of the regions visited. On Dolgoi Island it is so abundant as to give a yellow tinge to the tundra-land; plentiful around Habarova; the greater part of the island of Waigats is dotted over with it, and this is often the case in Novaya Zemlya and Lutke Land. It was found in flower and very abundant on the Pachtussow Islands and in Ziwolka Fiord.

55. S. STELLARIS L. forma *comosa* Poir. Common on Dolgoi Island and around Habarova; generally distributed over Waigats, from the shore to the highest ridges; very common in Novaya Zemlya and Lutke Land; abundant on the Pachtussow Islands.

56. S. NIVALIS L. Not observed by me on Dolgoi Island. May have been overlooked. It is common around Habarova, generally distributed over Waigats and Novaya Zemlya; also in Lutke Land, where it grows up to elevations of over 800 ft. It was found growing vigorously on the Pachtussow Islands.

57. S. HIERACHIFOLIA W. et K. This plant is by no means so abundant as several of the other Saxifrages. It is seldom if ever met with in beds, but springs up in individual stems at intervals; it is, however, very extensively distributed. Met with on Dolgoi Island, around Habarova, over Waigats (where plants were gathered up to twelve inches in height), over Novaya Zemlya, and Lutke Land; the most northerly station where it was observed being Ziwolka Fiord, 74° 25′ N.

58. S. CERNUA L. A widely distributed plant over the entire area under review. Common on Dolgoi Island, the same over the tundra around Habarova; on Waigats, from the shore-line to 200 ft.; all over Novaya Zemlya. Remarkably fine specimens were met with at Gubina Bay, at an altitude of 100 ft., the blossoms measuring $1\frac{1}{4}$ in. in diameter. It was found on the Pachtussow Islands, and in flower and growing luxuriantly in Ziwolka Fiord.

59. S. RIVULARIS L. Dispersed over Waigats and Novaya Zemlya, and Lutke Land; found in flower at Ziwolka Fiord. This herb varies much in growth. In suitable localities by the side of rills it attains to a height of two or three inches, but by the sea-shore it contracts to diminutive proportions, almost microscopic; under the lens, however, they show themselves to be mature flowering plants.

The root-growth of this variety likewise differs from the normal plant.

60. S. CÆSPITOSA L. forma *decipiens* Ehrb. Common on Dolgoi Island and around Habarova. A conspicuous plant in Waigats, especially near the sea-shore and on the deltas at the mouths of streams; there it may be seen growing in bosses, with hundreds of blooms springing up together to a height of 2½ in. to 3 in., the colour of the flowers varying from white to rich lemon-yellow. It is generally distributed over Novaya Zemlya; at Beluga Bay, Lutke Land, it was found growing at an altitude of 850 ft., but in a diminutive form; likewise obtained on the Pachtussow Islands.

61. CHRYSOSPLENIUM ALTERNIFOLIUM L. A common plant in swampy places on Dolgoi Island; the same around Habarova; likewise over Waigats and Novaya Zemlya. The most northern station where it was observed by me is Beluga Bay, Lutke Land, where it grew up to an elevation of 300 ft.

62. PARNASSIA PALUSTRIS L. var. *alpina* Drude. I met with this plant in some abundance on the west shore of Dolgoi Island, and again on the south shore of Waigats, to the east of Cape Greben. In both places the plants grew in peaty soil.

63. SEDUM RHODIOLA D.C. Common on rocks near the sea-shore on Dolgoi Island. The same on Waigats, extending from the shore-line to the highest elevations. Found on islands in Kostin Shar, Neckwatowa, Besemennaya Bay, Silver Bay, Beluga Bay, Matyushin Shar.

64. EPILOBIUM PALUSTRE L. Common in the neighbourhood of Habarova, in marshy spots on the island of Dolgoi, and in Waigats.

65. E. ALPINUM L. South side of the Matyushin Shar in the Farrasowa Valley, at an elevation of 250 ft.

66. E. LATIFOLIUM L. I did not find this plant in Waigats, but it is common enough in Novaya Zemlya. I found it on islands in the lake of Neckwatowa. It is extremely abundant in some of the valleys descending on both sides to the Matyushin Shar. It seems to flourish in dry watercourses, its roots bedding deeply amongst the stones and boulders. It must needs have a very secure root-hold, for when the snow first melts these watercourses are filled with raging torrents, which sweep over the plants. I noticed a cliff in the valley of Gubina Bay clad with this *Epilobium* to a height of 100 ft. It was growing by the acre round Beluga Bay of Lutke Land, and in full flower by July 31st, 1897.

67. PACHYPLEURUM ALPINUM Ledeb. Common around Habarova, widespread over Waigats, but seeking shelter under the lee of rocks. On Novaya Zemlya, at Neckwatowa, and islands in Kostin Shar. Not observed by me in Lutke Land.

68. VALERIANA CAPITATA Pall. Is a common plant on the tundra around Habarova. I found it rare on Dolgoi Island, generally dispersed over Waigats, common in Novaya Zemlya; at Neckwatowa, over Goose Land at Besemennaya Bay, where I gathered examples nine inches in height; and, though growing in profusion

at various localities on the south shore of Matyushin Shar, I do not remember meeting with it on the north side of that strait. Anyhow, there is no example in my collections from Lutke Land.

69. PYRETHRUM BIPINNATUM Willd. Not uncommon around Habarova. On Waigats, growing in sand near the sea; at Cape Voronoff; and at Cape Matiusela, on the east coast. Not met with by me in Novaya Zemlya.

70. MATRICARIA INODORA L. var. *phæocephala* Rupr. Grows near the sea-shore at Habarova; in great profusion on Waigats; around Dolga Bay of that island the strand just above high-water line was carpeted with this plant; abundant at Cape Greben. In Novaya Zemlya met with at Neckwatowa.

71. ARTEMISIA BOREALIS Pall. I did not observe this plant on the mainland around Habarova, but it is common on Waigats, from the shore-line to 100 ft.; it grows in the most exposed situations. It is common enough in Novaya Zemlya, where I found it at Neckwatowa, and Besemannaya Bay. At Beluga Bay, Lutke Land, it was likewise abundant.

72. A. VULGARIS L. var. *Tilesii* Ledeb. A common enough plant on the mainland around Habarova. All over Waigats, common in Novaya Zemlya, and at Beluga Bay of Lutke Land.

73. SENECIO RESEDIFOLIUS Less. Not uncommon on the mainland around Habarova. Met with on Waigats near Cape Greben, and at Dolga Bay. Not observed by me in Novaya Zemlya.

74. S. FRIGIDUS Less. Common around Habarova. Very abundant on peaty lands all over Waigats, its bright large yellow blossoms being quite a feature. I did not observe it in Novaya Zemlya.

75. S. CAMPESTRIS D.C. var. *integrifolius* Hook. Not uncommon on Dolgoi Island, the same around Habarova, and quite common over the south part of Waigats. I did not come across it in Novaya Zemlya.

76. ANTENNARIA CARPATHICA Br. Met with around Habarova and sparsely both at the north and south of Waigats.

77. ERIGERON UNIFLORUS L. Though hardly to be termed a common plant, it is to be found here and there on Waigats, where it affects sheltered ledges amongst rocks. I found it on islands in the lake of Neckwatowa, at Gubina Bay, and not uncommonly around Beluga Bay of Lutke Land.

78. PETASITES FRIGIDA Fr. Met with in considerable quantity on Dolgoi Island, where the stalks of the plant were over a foot high; at the time of my visit (July 20th) it was out of flower. Abundant around Habarova. It is a common enough plant in suitable localities, namely, wet bogs over Novaya Zemlya; gathered it in flower on Goose Land, July 26th, 1895. North of the Matyushin Shar, in Lutke Land, though I frequently met the plant, I never found it with the least sign of inflorescence.

79. Taraxacum officinale Web. Met with around Habarova. Common over Waigats, Novaya Zemlya, and Lutke Land.

80. T. phymatocarpum J. Vahl. Is a much scarcer plant than the preceding, and markedly different; its petals are delicately suffused with pink. I found it at Neckwatowa, and on islands in Kostin Shar, at Gubina Bay, and in Lutke Land as far north as Ziwolka Fiord in 74° 25′ N.

81. Campanula uniflora L. On Waigats I found it growing in considerable quantity on a rocky slope some 50 ft. above sea-level at Dolga Bay. It was in flower on July 8th. I met with it afterwards at Besemannya Bay, and at Beluga Bay of Lutke Land; also at other stations on the north side of Matyushin Shar.

82. Pyrola grandiflora Raddi. During the first week of July a *Pyrola* not in flower was common around Dolga Bay of Waigats. In the middle of July I found more in the same condition at Beluga Bay of South Goose Land; but on July 31st I was fortunate enough to obtain a *Pyrola*, at Beluga Bay of Lutke Land, coming into flower. This has been pronounced to be *P. grandiflora* without doubt. (Mr. I. H. Burkill remarks: "On dissecting a bud the stigma will be found to be that of this species.")

83. Arctostaphylos alpina L. I met with it at an elevation of 150 ft. at the north end of Waigats. Though recorded from Novaya Zemlya, from between the parallels of 72° and 73°, it is an addition to the flora of Waigats.

84. Vaccinium Vitis-idæa L. forma pumila Horn. Common on Dolgoi Island, the same on the mainland around Habarova. Spread all over Waigats, from an altitude of 50 ft. to highest points; in flower end of June and beginning of July. Met with at Neckwatowa and Beluga Bay of South Goose Land, but not observed by me in Lutke Land.

85. V. uliginosum L. Met with at the north end of Waigats, at an elevation of 150 ft. In Novaya Zemlya it only occurred to me at Gubina Bay, Matyushin Shar, at an elevation of 200 ft.

86. Cassiopeia tetragona L. I was interested in finding this plant, one of the commonest on the island of Dolgoi. It has not been met with on Waigats or Novaya Zemlya, but as Schrenk found it on the Great Tundra of the Samoyeds, almost at the nearest point to Dolgoi Island, its extension thereto was to be expected.

87. Andromeda Polifolia L. Very common on dry peaty knolls over the island of Dolgoi. The remarks on distribution of the preceding species apply equally to *A. Polifolia*.

88. Primula stricta Horn. The *Primula* I found on Dolgoi Island belongs to this species.

89. P. farinosa L. This is a very common plant on Waigats, from south to north; always found near the sea-shore in peaty soil. It is such a pretty flower, and so attractive, that I gathered hundreds of the blooms, and brought back scores of dried specimens, but all seem to be *P. farinosa*. In Novaya Zemlya I met with it at

Neckwatowa, and Beluga Bay of Goose Land. I did not meet with it north of the Matyushin Shar.

90. ANDROSACE CHAMÆJASME Koch. Common on the mainland around Habarova. All over Waigats, from the sea-shore to the highest summits. I did not meet with it in Novaya Zemlya.

91. A. TRIFLORA Adams. I found this plant at Neckwatowa in July, 1895, and growing abundantly at an elevation of some 500 ft. at Besemannya Bay, in August, 1897. I submitted specimens to Mr. O. Gelert, of the Royal Botanical Museum, Copenhagen, and he informed me:—"The *Androsace* you kindly sent is *A. triflora* Adams; specimens in a young flowering state are in our arctic herbarium from Besemannaya Bay, collected by Kjellman and Lindström, and are exactly the same as your plant."

92. CORTUSA MATTHIOLI L. This lovely little flower I only found at one spot on Waigats, namely, at the head of Dolga Bay, on July 4th, 1897.

93. ARMERIA SIBIRICA Turcz. Common on dry knolls over the island of Dolgoi. On the mainland around Habarova. Frequently met with on Waigats, from Cape Greben, and Dolga Bay. I found it in profusion and in beautiful bloom at Silver Bay, Lutke Land, on Aug. 10th, 1897.

94. POLEMONIUM CÆRULEUM L. forma ACUTIFOLIA Willd. Perhaps the most beautiful of all the flowers of these regions. The lovely cærulean blue of the blossoms and its tall growth and abundance in certain spots make it a very attractive plant. On Dolgoi Island it is abundant, growing in damp spots by sides of runnels. It is equally abundant on the mainland around Habarova. All over Waigats. At Dolga Bay it grew in suitable damp localities from the sea-shore to 100 ft. of altitude; very abundant at Cape Greben, and on the east coast at Cape Matiusela. At Cairn Harbour (Pomorsky Bay) it grew luxuriantly, specimens attaining a height of a foot or more, and the same around Beluga Bay of Lutke Land.

95. P. PULCHELLUM Bunge. I have some doubt whether this plant is specifically distinct from *P. cæruleum*. I have examined hundreds of specimens from the same cluster of plants. Typical *P. cæruleum* would be found growing a foot high, with its roots in the water of some rill; as the plants spread upwards, where the banks are higher and drier, the plants changed into what we call *P. pulchellum*, but with every phase of intergrading. The following appeared to me the fact: that *P. cæruleum* always grows in wet and damp spots, *P. pulchellum* on dry spots. I did not meet with typical *P. pulchellum* on Waigats, but found it abundantly dispersed over Novaya Zemlya, from islands in the lake of Neckwatowa, South Goose Land, Besemannya Bay, and Gubina Bay; on Lutke Land, at Beluga Bay, and as far north as Ziwolka Fiord, 74° 25′.

96. MYOSOTIS ALPESTRIS Koch. Occurs on Dolgoi Island, and on the mainland around Habarova. Abundantly dispersed all over Waigats. The flowers are of many shades of blue, sometimes pink, more rarely white. It is equally common all over Novaya Zemlya.

On Lutke Land I found it common, and as far north as the Pachtussow Islands, and Ziwolka Fiord.

97. Eritrichium villosum Bunge. Abundant over Waigats, Novaya Zemlya, and Lutke Land. Found on the Pachtussow Islands and Ziwolka Fiord. It seems to flourish best upon the bleakest islets near the shore; there this plant appears in little bosses of the most brilliant turquoise-blue, offering a most astonishing contrast to the shattered brown stones which form the surface. This plant is gynodiœcious in Novaya Zemlya, the hermaphrodite flowers being considerably larger than the female.

98. Gentiana tenella Fries. Quite typical. Met with in considerable quantity growing in peaty soil on the west side of Dolgoi Island. Found on the south side of Besemannya Bay, at an elevation of 150 ft. This plant is an interesting addition to the flora of Novaya Zemlya. It is recorded from Spitsbergen.

99. Veronica alpina L. It was somewhat of a surprise to find this alpine plant growing in close proximity to the sea, at about 20 ft. elevation, some three miles to the west of Habarova. It has not hitherto been recorded from Yugor Straits, or the north coast of Siberia.

100. Pedicularis lapponica L. On Dolgoi Island I found it growing sparingly on dry hillocks. Did not observe it in the neighbourhood of Habarova. On Waigats I met with it near Cape Greben, and also at the north end of the island, where it grows on the higher ridges. It is an addition to the flora of Waigats.

101. P. Oederi Vahl. I met with this plant only at Dolga Bay, island of Waigats, where it grew in great profusion over the tundra swamps, its large citron-yellow blossoms being very conspicuous and effective. Personally I have found little variation in the colour of the blossoms, but the experience of others is decidedly contrary to mine. Mr. Burkill has drawn my attention to the following. Wahlenberg, in proposing the name *versicolor*, does so in the following words (De Veget. et Clim. Helvetiæ septentr. p. 118):—"Galea tantum sub apice coccineo-maculata, macula exsiccando evanescente. . . . Nomine supra dato colorem fugacem simulque duplicem indicare volui." Thus he gives the name because the colour in Swiss specimens changes to pink below the top of the hood, and also fades in drying. But the plant varies in different localities, so that Bentham (DC. Prod. x. 578) says:—"Flores citrini vel unicolores vel galea sub apice rubra vel purpurea." My plants are of the first alternative. Bentham also adds that the proportional size of the hood varies in Arctic, Siberian, and European examples.

102. P. hirsuta L. This small lousewort is extremely common all over Waigats, growing in dry spots from the shore-line to the highest ridges, say, 250 ft. I met with it in abundance at Neckwatowa, over Goose Land, and many other stations. It is common enough on Lutke Land, in the neighbourhood of Beluga Bay, and the Matyushin Shar; it was common on the Pachtussow Islands,

and found sparingly in Ziwolka Fiord. The plants which I have gathered in Spitsbergen agree precisely with Novaya Zemlya specimens.

103. P. SUDETICA Willd. There are two very distinct forms included under this name. Both affect the same localities—damp, water-sodden tundra; they both abound on Waigats, and give a bright appearance to the areas over which they are spread. One form has a deep pink blossom and a dark stem, with very little wool about the blossom-head. The other form has blossoms of a very delicate pink shade, the stem light green, and a great deal of wool at the base of the blossom. The deep pink form with little wool I met with on Dolgoi Island, around Habarova, commonly on Waigats, and over Novaya Zemlya, and at Beluga Bay of Lutke Land. The light pink form with much wool I gathered on Waigats, Goose Land, and likewise on Lutke Land, at Beluga Bay. I presume these are the forms of *P. sudetica* described as formæ *gymnocephala* Trautv. and *lanata* Walp.

104. P. LANATA Willd. f. DASYANTHA Trautv. This plant grows in the wet tundra alongside of *P. sudetica;* the blossoms are of a bright rosy hue, and the flowering head is thickly clad with wool. I met with it in abundance on Waigats, and around Neckwatowa, in Novaya Zemlya.

105. PLANTAGO MARITIMA L. f. PUMILA Kjellm. Met with in some abundance on Dolgoi Island, and near Cape Greben, Waigats.

106. POLYGONUM BISTORTA L. A common plant on Dolgoi Island, around Habarova, and spread over Waigats from north to south. Not observed by me in Novaya Zemlya.

107. P. VIVIPARUM L. A ubiquitous plant. Abundant on Dolgoi Island, and around Habarova, all over Waigats, Novaya Zemlya, and Lutke Land, along the shores of Matyushin Shar, Beluga Bay, the Pachtussow Islands, and Ziwolka Fiord, where I met with specimens five inches in height.

108. RUMEX ARCTICUS Trautv. I only found this plant on the south shore of Waigats, and at Cape Matiusela, on the east coast of that island.

109. R. ACETOSA L. South shores of Waigats, Goose Land, and Besemannya Bay of Novaya Zemlya.

110. OXYRIA DIGYNA Hill. Universally distributed over Waigats, Novaya Zemlya, and Lutke Land, as far north as reached by me, *viz.* 74° 25′, on the east coast.

111. KOENIGIA ISLANDICA L. The only annual of these regions. Found it in considerable abundance at various stations around Beluga Bay of Lutke Land, and along the north side of the Matyushin Shar; at Besemannya Bay, Novaya Zemlya.

112. EMPETRUM NIGRUM L. Common on Dolgoi Island. Met with at Cape Matiusela, east coast of Waigats; an addition to the flora of that island.

113. BETULA NANA L. Common on Dolgoi Island; the same over Waigats; rarer in Novaya Zemlya. I do not remember

observing it north of the Matyushin Shar; anyhow, there is no example of it from Lutke Land in my collection. The stem of an apparently old plant from Waigats shows sixty annual rings.

114. Salix polaris Wahlenb. Abundant over Waigats, Novaya Zemlya, and Lutke Land, where it was obtained as far north as the Pachtussow Islands.

115. S. rotundifolia Trautv. Dolgoi Island; Cape Matiusela, Waigats; Silver Bay, Lutke Land.

116. S. reticulata L. Dolgoi Island; Habarova; Waigats; Novaya Zemlya; Silver Bay, Lutke Land.

117. S. arctica Pall. type, and var. Brownei Anderss. Dolgoi Island; all over Waigats, Novaya Zemlya, and Lutke Land, extending to the Pachtussow Islands. A stem of this plant from Lutke Land shows twenty-nine annual rings, but one which I gathered in Grinnell Land in 82° 45′ N. lat., the most northern latitude from which a willow has been recorded, has forty annual rings.

118. S. glauca L., with var. subarctica Lundstr. Only appears in the collection from Waigats, where it is quite common.

119. S. reptans Lundstr. From the south shore of Waigats.

120. S. tajmyrensis Trautv. From Beluga Bay and Silver Bay of Lutke Land.

121. S. lanata L. × S. glauca L. Dolga Bay, Waigats. (Apparently a hybrid of these two species, with which it was growing, I. H. Burkill.).

122. S. myrsinites L. Dolgoi Island, and Dolga Bay, Waigats.

123. Tofieldia palustris Huds. Dolgoi Island.

124. Allium sibiricum L. Common on Dolgoi Island, around Habarova, and at Cape Greben, and along the south shores of Waigats.

125. Lloydia serotina Reichenb. An abundant plant from north to south of Waigats, Cape Greben, Cape Matiusela, Dolga Bay. In flower last week of June, 1897.

126. Veratrum album L. Common along the banks of the Nikolski river, and in dry-stream beds around Habarova. I found it growing in abundance at the head of a bay on the east of Cape Greben, on the south shore of Waigats. It there attained a height of three feet, and was in flower on July 12th, 1897. An addition to the flora of Waigats.

127. Juncus castaneus Sm. Habarova; Cape Greben, Waigats; and Neckwatowa, Novaya Zemlya.

128. J. biglumis L. Generally distributed. Dolgoi Island, Habarova, Waigats, Novaya Zemlya, and over Lutke Land as far as the Pachtussow Islands. A very variable plant in size; there are specimens in the collection from Silver Bay eight inches in height.

129. Luzula Wahlenbergii Rupr. Dolgoi Island, and Habarova, Cape Greben, Dolga Bay, Goose Land.

130. L. CONFUSA Lindeb. Cape Matiusela; Dolga Bay, Waigats; Rogatchiva Bay; Neckwatowa; Goose Land; Pomorsky Bay; Gubina Bay; Beluga Bay of Lutke Land, up to 850 ft. altitude; Pachtussow Islands and Ziwolka Fiord.

131. L. ARCTICA Blytt. Dolgoi Island; Habarova; Besemannya Bay.

132. ERIOPHORUM ANGUSTIFOLIUM Roth. Dolgoi Island; Habarova; south shores of Waigats; Neckwatowa; Beluga Bay of Lutke Land.

133. E. VAGINATUM L. Cape Matiusela; Neckwatowa; Goose Land; Pomorsky Bay; Gubina Bay; Beluga Bay of Lutke Land.

134. E. SCHEUCHZERI Hoppe. Dolgoi Island; Cape Matiusela; Dolga Bay; Neckwatowa; Besemannya Bay; Beluga Bay of Lutke Land.

135. E. CALLITHRIX Cham. Dolgoi Island; Habarova; Cape Greben; south shores of Waigats; Beluga Bay of Lutke Land.

136. E. RUSSEOLUM Fries. Dolgoi Island; Habarova; south shores of Waigats.

137. CAREX PULLA Good. Habarova; Dolga Bay; Silver Bay.

138. C. ROTUNDATA Wahlenb. Dolgoi Island; Habarova; south shores of Waigats.

139. C. FULIGINOSA Schk. (*C. misandra* R. Br.). Dolgoi Island; Habarova; Dolga Bay; Besemannya Bay; south side, Matyushin Shar; Beluga Bay of Lutke Land; Silver Bay.

140. C. RARIFLORA Sm. Dolgoi Island; Habarova; south shores of Waigats; islands in Kostin Shar.

141. C. SALINA Wahlenb. f. SUBSPATHACEA Wormskj. South shores of Waigats; Pomorsky Bay; Matyushin Shar.

142. C. AQUATILIS Wahlenb. Habarova; south shore of Waigats; Cape Greben; Dolga Bay; Gubina Bay; Neckwatowa; Beluga Bay of Lutke Land.

143. C. RIGIDA Good. Dolgoi Island; south shores of Waigats; Dolga Bay; Kostin Shar; Besemannya Bay; Pomorsky Bay; north side Matyushin Shar; Beluga Bay, Lutke Land.

144. C. GLAREOSA Wahlenb. Dolgoi Island; Habarova.

145. C. LAGOPINA Wahlenb. South shores of Waigats.

146. HIEROCHLOE ALPINA R. & S. This is a common grass scattered over Waigats, Novaya Zemlya, and Lutke Land. It generally occurs in tufts and bunches on dry ground, and from its straw colour and the glistening of the glumes attracts attention. Dolga Bay, Rogatchiva Bay, Beluga Bay, Matyushin Shar, and common at Ziwolka Fiord, 74° 25′ N.

147. H. PAUCIFLORA R. Br. I find it common in the collection from South Goose Land and Neckwatowa. Probably overlooked by me at other stations.

148. ALOPECURUS ALPINUS Sm. Not very common; obtained at Habarova, Cape Matiusela, Besemannya Bay, Gubina Bay, Pachtussow Islands.

149. A. PRATENSIS L. var. ALPESTRIS Wahlenb. Waigats.

150. AIRA CÆSPITOSA Beauv. With its vars. *alpina* and *brevifolia* is widely distributed over Waigats, Novaya Zemlya, and Lutke Land. I found it not uncommon on the Pachtussow Islands.

151. CALAMAGROSTIS NEGLECTA Gaertn. Common along the south shore of Waigats. I gathered it again in Pomorsky Bay, Matyushin Shar. Mr. Burkill writes:—"With regard to the *Calamagrostis*, I have come to the following conclusions: that habit and acuteness of the glumes are the characters on which mainly to rely. I cannot separate *Calamagrostis Holmii* specifically from *C. neglecta*, and should place the arctic forms as follows:—*C. neglecta* (*Deyeuxia neglecta* Kunth). The type is the well-known plant of North-western and Central Europe and Siberia. It is a plant from two to three feet high. Var. *borealis* Laestad., Lange, *Conspectus Fl. Groenlandicæ*, p. 161: a low plant with acute glumes. Var. *Holmii* (*Calamagrostis Holmii* Lange): of the same habit as the last, but perhaps more densely tufted, differing chiefly in its somewhat acuminate glumes. This last we have from Spitsbergen, Axel Island (A. Trevor-Battye). The character which Lange drew from the position of the awn becomes useless, for, though in his type it is situate above the middle of the glume, in your specimens, which I am now quite satisfied are identical, it is sometimes at the middle, but more often below it." On the other hand, I submitted specimens from Waigats to Mr. Th. Holm, and he writes me from Washington, U.S.A., that he does not hesitate to identify the plant as *C. Holmii*. He remarks that the details of the spikelet and the characteristic coloration of the empty glumes in *C. Holmii* are also present in the specimen sent by me. *C. Holmii* as described by Lange was obtained originally by Mr. Holm on the mainland of Yugor Straits.

152. TRISETUM SUBSPICATUM Beauv. Waigats, South Goose Land, Besemannya Bay, south shores of Matyushin Shar.

153. DUPONTIA FISCHERI R. Br. A widely distributed grass; common on Dolgoi Island, around Habarova, Waigats, Novaya Zemlya, and Lutke Land.

154. COLPODIUM LATIFOLIUM R. Br. A widely distributed plant. Habarova, Waigats, Novaya Zemlya, and Lutke Land.

155. PHIPPSIA ALGIDA Br. and var. P. CONCINNA Fries. There is a large series of this grass in my collection, all in flower, from Waigats, Novaya Zemlya, and Lutke Land, varying from a plant nine inches in height to a dwarf form of less than an inch. The tallest examples, var. *concinna*, come from Cape Matiusela, Waigats, the more dwarf from Lutke Land. It is not uncommon on the Pachtussow Islands and Ziwolka Fiord.

156. PLEUROPOGON SABINII R. Br. The known distribution of this grass is very remarkable. So far it has not been met with on the mainlands of the Old or New Worlds, but is confined to the islands of the polar and arctic regions and Greenland. First discovered by Sabine on Melville Island, 1819; it was subsequently met with by

our arctic explorers in several localities amongst the American Arctic Archipelago, notably by Dr. Walker, at Bellot Straits; by Dr. Lyall, at Powell Creek; and by Admiral Markham, at Fury Beach. It is apparently a common plant on the western side of Davis Strait, for Mr. James Taylor remarks (Trans. Bot. Soc. Edinb. vii. p. 333) that it grows from the coast-line to 200 ft. in pools of water, on any kind of soil. It is perhaps the finest of arctic grasses; its leaves float on the surface, the culm rising from nine inches to one foot above the water, bearing its beautiful purple florets. Found at Cumberland Gulf, Cape Searle, Scott's Bay, Cape Adair. Prof. Nathorst discovered it at Cape York, in North Greenland. It appears to be absent from Grinnell Land, for Mr. H. C. Hart failed to find it around Discovery Bay, or on the opposite Greenland shore of Smith Sound in 1875–76; and I was equally unsuccessful in finding any trace of it in Grinnell Land, between the eighty-second and eighty-third degrees; whilst the members of the Greely Expedition were not more fortunate. Turning to the eastern hemisphere, it was first recorded by Von Baer from Novaya Zemlya, 1837, and subsequently by various other botanists from that group. The botanists of the Vega Expedition found it in Actinia Bay, Taimur Island, off the coast of Siberia; and Mr. H. Fisher has recently discovered it in the Franz Joseph Land group, but only at one spot, a small pond on Mabel Island. I found it growing abundantly in pools of water and damp situations on the western shores of Beluga Bay of South Goose Land, at Pomorsky Bay, abundantly at Silver Bay, at Gubina Bay, at many places on both sides of the Matyushin Shar, all around Beluga Bay of Lutke Land, where it grows from the shore-line to a height of 750 ft., and I met with it, but in a somewhat stunted form, at Ziwolka Fiord, 74° 25′ N. *P. Sabinii* is distinctly a water-growing grass; its long roots are firmly attached in the soil or mud, the leaves float on the water, and, as Mr. Taylor remarks, its purple inflorescence makes it quite conspicuous; it is certainly the most beautiful of all the arctic grasses. It seems somewhat singular that such a common and generally dispersed plant over Novaya Zemlya and Lutke Land should have attracted so little attention. Can it be that the exceptionally fine summer of 1897 caused it to bloom more freely than usual? The tallest plants I gathered were from Pomorsky Bay, and are over a foot in length. *Pleuropogon Sabinii* is one of about half a dozen species not found outside the Arctic Circle. It was formerly held to be the only *genus* confined to arctic limits, but three others of the genus have since been found in America.

157. KOELERIA CRISTATA Gaud. Cape Greben and Cape Matiusela, Waigats.

158. GLYCERIA VAHLIANA Fries. Only appears in my collection from Beluga Bay and Lutke Land, at an elevation of 100 ft.

159. ARCTOPHILA FULVA Nym. This is the tallest and most striking grass of the regions visited. On Dolgoi Island very abundant in meres and ponds, standing two and three feet above water, affording shelter for broods of ducklings, and phalaropes and water,

loving species of birds. On the mainland tundra around Habarova very common; shallow meres and ponds scattered over the tundra are in July given a lively verdant green colour from the dense beds of this grass, and looking over the dull grey tundra from some slight elevation these bands and circles of green look like oases in the desert, and are quite a relief to the eye tired of gazing on a sad brown landscape. Common all over Waigats from Cape Greben to Dolga Bay; common at Pomorsky Bay, south side of the Matyushin Shar, but I did not come across it in Lutke Land. With reference to the nomenclature of this plant, I add the following note from Mr. I. H. Burkill, from which it appears that the *Arctophila*, so abundant on the Arctic Russian tundras, Waigats, Dolgoi, and likewise in Novaya Zemlya, is, in his opinion, *A. fulva* Nym.:—"*Arctophila effusa* Lange twice figured in the *Flora Danica* (tab. 2343 and tab. Suppl. 126), is not the common Arctic European plant which has sometimes passed with this name. The European plant, *A. fulva* Nym., does not deserve the name of *effusa* at all, and is fairly easily distinguished from the Greenland form in the greater density of its panicle. It also occurs in North America. At Kew we have your grass as *A. fulva*, collected by Kriwoscheja, and named as *A. effusa*, collected by Kjellman and Lundström."

160. Poa pratensis L. There are specimens in the collection from Waigats, and likewise from Ziwolka Fiord, Lutke Land.

161. P. abbreviata R. Br. Mr. Burkill determines this species from specimens obtained from various localities around Beluga Bay and Lutke Land; one of the stations is 800 ft. in altitude.

162. P. alpina L. I am greatly indebted to Mr. Burkill for the immense trouble he has taken in working out the *Gramineæ* in my collection, consisting of many hundreds of specimens; according to his determinations, this species occurs on Dolgoi Island, common around Habarova, all over Waigats, over Novaya Zemlya, and Lutke Land.

163. P. arctica Br. Mr. Burkill unites *P. cenisea* All. and *P. stricta* Lindeb. with this species; according to his determinations, *P. cenisea* is the prevailing form; it occurs in my collections from Dolgoi Island; on Waigats plentiful from shore-line to 100 ft.; Cape Greben; south shores of Waigats; Cape Matiusela; Dolga Bay, and northern shores. From Novaya Zemlya, South Goose Land, Kostin Shar, Besemannya Bay, Pomorsky Bay, Gubina Bay, all the south shores of Matyushin Shar, over Lutke Land as far north as the Pachtussow Islands and Ziwolka Fiord. *P. stricta* seems to be a far less common form.

164. Festuca rubra L. var. arenaria Osb. Gubina Bay, Besemannya Bay, and Pachtussow Islands.

165. F. ovina L. Habarova.—Subspecies F. brevifolia R. Br. Beluga Bay, Lutke Land, and Ziwolka Fiord.

166. Equisetum arvense L. Dolgoi Island; Habarova; all over Waigats in suitable localities; all over Novaya Zemlya in suitable localities; Beluga Bay and Lutke Land.

167. Lycopodium Selago L. Met with on Dolgoi Island, and common on Waigats.

168. Cystopteris fragilis Bernh. Dolga Bay, Waigats, Besemannya Bay, and head of Beluga Bay, Lutke Land, at an elevation of 500 ft.

Conclusions.

I venture to offer a few remarks based upon my observations of plant-growth over the areas referred to in the preceding pages. Sir Joseph Hooker has long since pointed out that Lapland is by far the richest province of the Arctic regions, whilst Arctic Asia from the Gulf of Obi to Bering's Straits contains by far the poorest flora of any on the globe. That great authority, though including Spitsbergen, Novaya Zemlya, and the arctic countries west of the river Ob in the Lapland province, has shown that in that area there are two floras corresponding to the Arctic-Norwegian and Arctic-Russian, the latter commencing at the White Sea, and comparatively exceedingly poor in species, though containing some twenty that are not Lapponian. Mr. Philip Sewell has given us an excellent treatise on this subject* in his paper on the Flora of Lapland and the Yugor Straits, in which he vividly depicts the poverty of the Arctic-Russian province in comparison with the Lapponian, and he expresses the opinion that the low-lying land eastward from the White Sea affords no suitable foothold which would allow of eastward distribution along the same line of latitude, and that the difference in the physical nature of the region of the Yugor Straits and the greater cold thereabouts are evidently the chief causes which restrict the distribution. This no doubt is correct as far as it goes, but it may not be amiss to enter more fully into the physical differences which characterize the two regions of Lapponia and Arctic Russia. Lapland and the Kola Peninsula are mountainous or elevated regions bearing on their surfaces the impress of glacio-terrene action. They appear to me as areas from which an ice-cap, or mer-de-glace, has but recently been removed, and we may assume that during the period of maximum Scandinavian glaciation Lapland and the Kola Peninsula were heavily clad with ice, and considerably raised above sea-level. Judging from what we now see in Greenland, Grinnell Land, Spitsbergen, and Franz Josef Land, we may reasonably infer that phanerogamic vegetation was not actually extirpated throughout Scandinavia and Lapland during the period of maximum ice accumulation.

The theory that a huge ice-cap at one period covered the entire polar area entirely rests on assumption and hypothesis. If, as I surmise, Lapland during its ice-period retained a flora, even as much as now exists in Grinnell Land and the north of Greenland between the parallels of 82° and 83°, that would on the retirement of the ice become an important factor in the dissemination of a flora over an area recently released from ice, whilst in all probability a more extensive flora lived through the Scandinavian ice-age than we now find in Grinnell Land. On the other hand, from the eastern side of the White Sea, as far at least as the bases of the Urals and Paechoi Mountains, between the arctic circle and the seventieth parallel, we see evidences of recent emergence from an ice-laden sea. Whether this marine transgression over a considerable part of Arctic Russia was contemporaneous with, or later than, the period of maximum ice-development in Scandinavia and Lapland, does not affect the conclusion that the emergence of this extensive area has been very recent, and this with severe climatic conditions must have greatly restricted the incoming of a migrating flora. I assume that in Lapland, on the retirement of the ice, many nuclei of vegetation were at hand; in Arctic Russia the recent floor of a retiring ocean offered a most inimical soil to an invading flora.

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* "Flora of Lapland and Yugor Straits," Trans. Edinb. Bot. Soc. xvii. 444–481.

The evidences* at our command seem to be convincing that the tundra of Arctic Russia, and the islands of Waigats, Novaya Zemlya, and Lutke Land were in recent times submerged many hundreds of feet below their level of to-day. Great as this submergence was, it does not follow that the higher mountains of Novaya Zemlya or of the North Island were involved, and if we discard the theory of a universal ice-cap, there is no reason to deny the possibility of survival of some ancient arctic flora on those lands.

That the floras of Kolguev Island, Dolgoi Island, Waigats, Novaya Zemlya, and Lutke Land are in their main features identical with that of the adjacent Russian mainland is undoubted, and that the spread of their vegetation has been chiefly longitudinal from the southward seems to be true. But how are such peculiarities in dispersal as the following to be accounted for? *Saxifraga flagellaris*, a plant widely distributed over the polar area, and otherwise restricted to the high mountain regions of the Himalaya, Altai, and Caucasus. Still more remarkable is the distribution of the arctic grass *Pleuropogon Sabinii:* so far it has not been met with on the mainlands of the Old or New World, and yet it is a widely dispersed plant throughout the polar regions. If the vegetation now existing in the polar area be due solely to immigration from the south since the withdrawal of a glacial epoch, it is certainly strange why *P. Sabinii* has got back there without leaving a trace of its existence south of the arctic circle. It may not be out of place to draw a comparison between the plants growing in the most northern known parts of the earth and the floras of Spitsbergen and Novaya Zemlya.

The following thirty-two plants† represent the flora of Grinnell Land and islands to the north of Greenland between 82° and 83° 24′ N. It is the flora growing nearest the Pole, all other flowering plants having been gathered south of the eighty-second parallel:—

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* Feilden, *Geographical Journal*, xi. 357.

† They were gathered by the officers of the British Polar Expedition, 1875–76, and the late Lieut. Lockwood, United States Army.

Ranunculus affinis.
R. nivalis.
Papaver nudicaule.
Cochlearia fenestrata.
Braya alpina.
Draba alpina.
D. hirta.
D. rupestris.
Wahlenbergia apetala.
Arenaria rubella.
Cerastium alpinum, and var. *cæspitosum.*
Dryas integrifolia.
Potentilla nivea.
Saxifraga oppositifolia.
S. cernua.
Saxifraga flagellaris.
S. cæspitosa.
S. tricuspidata.
S. nivalis.
Epilobium latifolium.
Taraxacum officinale.
Salix arctica.
Polygonum viviparum.
Oxyria digyna.
Alopecurus alpinus.
Poa abbreviata.
Festuca ovina.
Eriophorum angustifolium.
Juncus biglumis.
Carex nardina.
C. fuliginosa.

Of these all but three—*Dryas integrifolia*, *Saxifraga tricuspidata*, and *Salix arctica*—occur in Spitsbergen, whilst only two are absent from Novaya Zemlya, namely, *Dryas integrifolia* (and in both countries the nearly allied *Dryas octopetala* takes its place), and *Saxifraga tricuspidata.*

If the lines of plant migration towards the Pole emanate entirely from Europe, Asia, and America since the close of the glacial epoch, it is a remarkable coincidence that as these routes converge around the Pole from different sides of the hemisphere, the more characteristic plants of those regions of the earth become eliminated, and a nearly homogeneous flora is to be found on the lands nearest to the northern apex of the globe. Does not this give some colour to the hypothesis that a remnant of a palæarctic flora has been spared, and is represented by this more or less identical flora in the highest latitudes on different sides of the Pole? It may be urged, on the contrary, that the coincidence arises merely from these plants being better able to withstand severe climatic conditions.

I am satisfied that a large number of the plants of Waigats and Novaya Zemlya propagate from seed, so often did I meet with old plants surrounded by groups, to my mind, of undoubted seedlings; this is notable with *Cochlearia*, *Draba*, *Taraxacum*, *Papaver*, and a number of other species. This does not, however, invalidate the opinion that the flowering plants of Grinnell Land, some thirteen degrees nearer the Pole than Waigats Island, are not reproduced by seed, but that their extension is due to the creeping and spreading powers of the individual plants. This view has been forcibly advocated by Mr. H. C. Hart,* and my own observations in the same regions as he refers to lead me to embrace similar conclusions.

(To be continued.)

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* "Botany of British Polar Expedition," in Journ. Bot. 1880.

HABENARIA VIRIDIS VAR. BRACTEATA.

By James Britten, F.L.S.

In the *Botanical Exchange Club Report* for 1896 (issued 31 Aug. 1898) Mr. Druce has a note headed "*Habenaria viridis* R. Br. in Aiton, Hort. Kew. ed. 2. v. 192, var. *bracteata* mihi." This name he gives to "the more frequent form in mountainous districts of Scotland"—a form to which he had previously referred in his Berkshire Flora as having "frequently the bracts longer than the flowers." He gives no description, so that the name is entitled to no consideration, and might be tacitly ignored, were it not that it had been previously employed by other authors. There is nothing in Mr. Druce's note to lead to the conclusion that he had the earlier var. *bracteata* in view: he cites none of the synonymy belonging to that variety, and his plant seems to stand on the same footing as his "var. *bracteata*" of *Scilla festalis*, of which the sole character is that "the bracts are often so much developed as to considerably exceed the flowers."

Everyone knows that the length of the bracts in *Habenaria viridis* is extremely variable; thus Parlatore (Fl. Ital. iii. 409) writes: "Questa specie varia molto per la lunghezza delle brattee che ora sono soltanto più lunghe dell' ovario, ora due o tre volte più lunghe dell' ovario e del fiore: però si trovano tutte le forme intermedie," and it seems undesirable to base a variety on a character of so little importance. But the name has, as I have said, already been employed for a plant which many recent botanists regard as a distinct species—the *Orchis bracteata* of Willdenow (*Habenaria bracteata* R. Br.) to which the name *H. viridis* var. *bracteata* is applied as a synonym by Morong in the American Check-list. It is true that both here and in Dr. Britton's *Illustrated Flora* (iii. 463) this name is inaccurately cited from "Reich. Ic. Fl. Germ. xiii. 130," where it appears as *Platanthera viridis* var. *bracteata;* and it may be added that Parlatore (*l. c.*) considered that Reichenbach had confused a form of *H. viridis* with long bracts with the plant of Willdenow, Brown, and Lindley. But the last-named (Gen. Sp. Orchid. Pl. 299) doubts whether the plant of the two former authors is really distinct from *P. viridis*; "at least," he says, "I can find no mark of distinction beyond the length of the bracts." I have seen no British specimens agreeing with Reichenbach's figure, but it agrees sufficiently well with North American specimens of *H. bracteata* and with the figure in Dr. Britton's Flora; and Richter (Pl. Europ. i. 279) places it with the rest under his *Cœloglossum viride β bracteatum*.*

It may be worth while for British botanists to look into the matter, and ascertain whether we have any plant corresponding with Reichenbach's, or with *H. bracteata* Br., should these two prove distinct. Meanwhile it may be well to put on record that the first publication of the name *Habenaria viridis* var. *bracteata* should stand as "Morong in American Check-list, p. 121 (1894)."

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* He also places here *Orchis viridis β Vaillantii* Ten. Syll. 629 (1831), but I think incorrectly.

SIXTY YEARS OF BRITISH MYCOLOGY.

[A PAPER bearing the above title was read by Dr. M. C. Cooke at a meeting of the Essex Field Club on Oct. 16, 1897, and is printed in full in *The Essex Naturalist*, vol. x. pp. 216–223 (published March, 1898). We extract from it the following interesting statistics.—ED. JOURN. BOT.]

The *Supplement* to Smith's *Flora*, by M. J. Berkeley, in 1836, inaugurated the special study of Fungi. Hooker remarks in his preface that "notwithstanding all that has been done by Withering, Sowerby, Purton, Carmichael, and Greville, the Fungi must yet be acknowledged as the least understood of all our British Flora." If we allow our imagination to revert to this period we can soon discover from the local floras—Abbot's *Flora Bedfordiensis* (1798), Jones and Kingston's *Flora Devoniensis* (1829), Greville's *Flora Edinensis* (1824), Hooker's *Flora Scotica* (1821), Hudson's *Flora Anglica* (1778), Johnston's *Flora of Berwick-on-Tweed* (1829) Lightfoot's *Flora Scotica* (1777), Mackay's *Flora Hibernica* (1836), Purton's *Midland Flora* (1817), Relhan's *Flora Cantabrigiensis* (1820), Sibthorp's *Flora Oxoniensis* (1794), to which may be added Withering's *Arrangement* 3rd edition (1796), and Gray's *Natural Arrangement* (1821)—the extent of knowledge possessed by botanists of the fungi of their localities.

From these sources we discover that the total number of fungi known for the localities determined were :—

Abbot's *Flora Bedfordiensis* (1798)	284
Jones and Kingston's *Flora Devoniensis* (1829)	145
Greville's *Flora Edinensis* (1824)	410
Hooker's *Flora Scotica* (1821)	212
Hudson's *Flora Anglica* (1778)	126
Johnston's *Flora of Berwick*	336
Lightfoot's *Flora Scotica* (1777)	73
Mackay's *Flora Hibernica* (1836)	none
Purton's *Midland Flora* (1817–1821) ...	395
Relhan's *Flora Cantabrigiensis*	254
Sibthorp's *Flora Oxoniensis* (1794)	232
Withering's *Arrangement* 3rd edition (1796)	555

To which we may add for comparison—

Gray's *Natural Arrangement* (1821)	803
Berkeley, in Smith's *English Flora* (1836) ..	1390

Hence we learn that the total of British Fungi known previous to her Majesty's accession were—

1836 Berkeley's *Supplement*	1390

and afterwards—

1860	Berkeley's *Outlines of Fungology* ...	1450
1871	Cooke's *Handbook*	2810

It is only by comparison of statistics that we can realize the progress which has been made in sixty years. From investigations made about two years ago it became manifest that the total number of species of Fungi recorded for the British Islands had advanced from the 1390 of 1836 to no less than 5200 in 1896, or nearly four times the original number. In the previous fifty years the total had only advanced from 555 in 1796 to 1390 in 1836. Hence the increase in the number of recorded species was nearly double the ratio of increase in the preceding half century.

This fact leads us to a second enquiry and that is, to ascertain in what section of that particular study was the increase the most remarkable. By comparison of the same authorities we can learn that the number of species of larger fungi, determinable by the naked eye, principally the Basidiomycetes, were recorded in 1836 as about 570 species, whereas in 1896 the same group was represented by 2030 species.

Passing from the Hymenomycetal Fungi, and all or almost all those of conspicuous size, we must turn to those which require the use of the microscope for their discrimination and determination. Here it would be well to distinguish two or three large groups as a sample of the whole. If we take the Discomycetes, or fungi of the *Peziza* type, we find some of them of a large size, but the majority are very minute and scarcely visible to the naked eye. If we take for comparison the list of species from Berkeley's *Supplement* we shall find that 154 species were recognized in 1836, whilst Mr. Phillips enumerated 607 in 1887, or just four times as many in fifty years. This marvellous increase in the number of known species must be attributed partly to the increased number of observers, partly to the energy and application of a limited number of workers, and partly to the improved condition of the microscope and the methods of microscopical manipulation. Any way it represents an important fact in the history of British mycology in the past sixty years.

Another important group are the Sphæriaceous Fungi, or technically the Pyrenomycetes, but it would be a question of time to analyze the lists of 1836 and compare them with those of 1896. We may suggest that whilst the whole of the microscopical fungi, except the Discomycetes, which were enumerated in 1836, was only 665, the number in 1896 had risen to 2550.

One other group need be only briefly alluded to, and that is the group which contains the pests which infest garden and field crops. Some call them the Hypodermæi, but they are popularly the "Rusts" and "Smuts" so destructive to vegetation. A difference in the methods of classification would interfere with a satisfactory comparison of numbers at remote periods, but it may be taken for granted that in this department also important numerical results have been obtained in sixty years.

SHORT NOTES.

Cerastium arcticum Lange. — On p. 386 Mr. F. N. Williams expresses the opinion that this is a hybrid between two forms of *C. alpinum.* I do not believe that British botanists will endorse this theory. The plant certainly grows associated with our two varieties (a. *lanatum* and b. *pubescens*) in some of its stations; but it is not intermediate between them, being of a brighter and deeper green than either, less shaggy in pubescence, with different seeds, and a rather different habit. It also occurs alone, as on Cairntoul and Ben More of Assynt. Our *C. arcticum* appears to be accepted by Mr. Williams, as it was by Dr. Lange himself. Having collected it in more than half a dozen stations, and also cultivated it for a time, I am disposed to consider it as a distinct, though of course closely allied, species. Why var. *Edmonstonii* should be termed an "obscure" form, I cannot imagine; it clearly belongs to *C. arcticum*, and Mr. Beeby informed me (in 1894) that it extends "over acres in profusion" in Unst. *C. alpinum* does not appear to occur in Shetland. The true *C. latifolium* is absent from Britain, so that Norman's solution can hardly be correct.—Edward S. Marshall.

Elatine Hydropiper L. (p. 400). — If Miss Lister means that *Elatine Hydropiper* had not been gathered at Cut Mills before she found it there, it is a mistake. The locality is well known, and was discovered by the late W. W. Reeves. It has also been gathered in Worcestershire, whence there is a specimen in Mr. H. C. Watson's Herbarium at Kew, gathered by Mr. Irvine; and in Staffordshire (Journ. Bot. 1895, 283), where it was found by Mr. J. E. Bagnall. Mr. Watson's note in his MSS. in the Department of Botany, British Museum, runs: "In a mill pond near Churchill Station, 3 or 4 miles from Kidderminster, A. Irvine in letter of 27 Nov. 1855, with specimen." In this Journal for 1884, p. 41, Mr. W. Mathews says that every mill-pond in the neighbourhood of Churchill, Worcester, had been examined, but no trace of any *Elatine* had been found. This would be the year to look for it.—Arthur Bennett.

In his *Flora of Anglesey and Carnarvonshire* Mr. J. E. Griffith observes (p. 26) under *E. Hydropiper:* "I have seen this growing with the above [i. e. *E. hexandra*] in Llyn Coron, but of late the place where it used to grow is covered with *Chara.*" It may therefore be worth while to record that, in company with my brother G. S. West, I saw it growing there on the E. side on Aug. 10, 1888. On Aug. 1, 1891, we could not find it there, but a fortnight later my father found it in small quantity on the other side of the lake. I have twice seen *E. Hydropiper* at the Cutmill station, and found it quite easy to distinguish, while still *in situ*, from the *E. hexandra* with which it grows. *E. hexandra* forms small compact mats, the leaves being more or less adpressed to the ground; but the plants of *E. Hydropiper* are more straggling, of a paler green, and especially the pairs of leaves are markedly suberect. It is worthy of mention that the Cutmill and Anglesey specimens are much less in size than some from Frensham gathered by Messrs. H. & J. Groves on Sept. 10, 1883. Mr. Druce records the species from Berkshire (*Flora of Berkshire*, p. 105). He says the plant is "very minute." —W. West, Jun.

Bibliographical Note.—Referring to Mr. Williams's note on p. 384, line five from bottom, I do not agree with him in thinking the *Index Kewensis* is incorrect in the instance cited. Dumortier's title-page runs thus:—"Commentationes botanicæ. Observations botaniques, dédiées à la Société d'Horticulture de Tournay." The half-title has only these words: "Commentationes botanicæ." Pritzel puts "Observations botaniques" in parentheses. From the foregoing it seems clear that Dumortier intended the Latin phrase to be his title for citation, and appended the French one to amplify it. The whole matter is very trifling, but many who have not Dumortier's tract to consult might be led to think that I arbitrarily altered the title of the work, which is not the case.—B. Daydon Jackson.

Melampyrum cristatum L. in Hants.—In Mr. Townsend's *Flora of Hampshire*, p. 238, two stations are given in the county for the above species, but it does not seem that the author had seen specimens. It may therefore be worth recording that there are specimens in the Cardiff Museum Herbarium, gathered by Mr. Pamplin in 1828 at the place named in the *Flora*. *Verbascum Lychnitis* is excluded from the Hants Flora and from *Top. Botany*. In the eighth edition of Hooker and Arnott's *British Flora*, p. 320 (1860), they remark, "Often yellow in the Isle of Wight." Are there any specimens in Arnott's Herbarium at Glasgow?—Arthur Bennett.

Scalia Hookeri in West Inverness.—Mr. Symers M. Macvicar has recently collected this extremely rare Hepatic near Invermoidart, and has kindly sent me specimens for confirmation. The only other Scottish record that I am aware of is that given in Hooker's *Brit. Jungermanniæ*:—"In the moss of Kinnordy, Kerriemuir, Mr. Lyell, August, 1813." I am afraid it is now extinct in the recorded English stations,—New Forest, C. Lyell, 1812; Barnaby Moor, near York, R. Spruce, 1842; and Penzance, W. Curnow, 1844. It has been found in one locality in Ireland,—Connor Hill, Prof. Lindberg,—and in a few stations on the Continent.—W. H. Pearson.

Isle of Man Plants (see Journ. Bot. 1896, 448; 1897, 11, 75). —The Rev. E. M. Savage, of St. Thomas's Vicarage, Douglas, has called my attention to Thwaites's *Directory of the Isle of Man*, 1863, where a list of Manx plants is given by the Rev. H. A. Stowell. Collating this with the records in *Top. Bot.* and this Journal, the following occur which are not given in either:—*Corydalis claviculata*, *Viola lactea*, *Epilobium alsinefolium*, *Saxifraga tridactyles*, *Linaria Elatine*, *Galeopsis versicolor*, *Stachys ambigua*, *Solanum nigrum*. It will be well that these should be confirmed before they are admitted to the Manx flora. In *Science Gossip*, 1886, p. 69, Mr. Moffat records *Dianthus Armeria* from "two places near Castleton twelve years ago, but one is now destroyed." Mr. P. Ralfe, of Laxey, has sent me Manx specimens of the following, which are so far new records for the isle:—*Hypericum perforatum*, *Geum urbanum*, *Epilobium hirsutum*, *Veronica Anagallis*, *Leontodon autumnale*. There are still a good many common plants to be recorded for the island. I am glad to say that some residents are showing an interest in the Manx flora.—Arthur Bennett.

Sisyrinchium angustifolium in Co. Cork.—In June of this year, while staying at Coesheen, near Schull, Co. Cork, I found a small colony of this species. The plants were growing a few inches from the side of a very wild country road, on the margin of a bit of waste land which sloped down to a stream; they were few in number, and almost hidden by a spray of bramble which drooped over them. It is highly improbable that the plant can have been other than wild, as the district is mountainous, very desolate, and sparsely inhabited; while the by-road beside which it grew is little used, and quite remote from cultivation, even the nearest cottage being at a considerable distance. As the plants were few, it is probable that *S. angustifolium* may only recently be located there, a view which is rendered the more likely by my failing to find any other specimens, although we searched the neighbourhood. We carefully left the colony undisturbed, and hope to find it increased on our next visit. As this station is a considerable distance from the two other spots in Ireland in which the plant has been recorded, its occurrence at Coesheen is of interest. The plant was identified for me by Prof. Johnson, of Dublin.—Lilian M. Swan.

Carex Sadleri Linton in North Uist.—On a low ledge of rock at the base of the North Lee Hill, on the side facing northwards towards Lochmaddy Bay, I gathered on July 22nd last a *Carex* which by its characters at once recalled to my mind the Rev. E. F. Linton's description of his *C. Sadleri* in Journ. Bot. 1898, p. 41, &c. Typical *C. binervis* was growing within a foot or two of the spot, and though the two were very similar in habit and in most of their characters, the dark brown spikelets and much narrower perigynium of the one seemed to indicate at least a varietal difference between the two plants. Mr. Linton, who has kindly examined the specimens, writes, "without doubt *C. Sadleri;* a good extension." I had no aneroid with me at the time, but the altitude could not have been greater than 250 ft., and was probably less. After searching about for a considerable time, the original tuft of eight or ten specimens was all that I could find, though the plant is conspicuous at some little distance by the rich dark colour of its spikelets. It may probably grow in more abundance on some of the higher ledges.—W. A. Shoolbred.

BIOGRAPHICAL INDEX OF BRITISH AND IRISH BOTANISTS.

By James Britten, F.L.S., and G. S. Boulger, F.L.S., F.G.S.

First Supplement (1893–97).

(Continued from p. 271.)

Lymburn, Robert (d. 1843): d. Kilmarnock, 31 Oct. 1843. Physiologist. Contrib. to Gard. Chron. and Loudon, Gard. Mag. Loud. Gard. Mag. xix. 677 (1843).

MacEncroe, Demetrius, *alias* **De la Croix** (fl. 1728): b. Ireland. M.D. 'Connubia Florum,' Paris, 1728; edited by Sir Richard Clayton, Bath, 1791. Pritz. 173; Jacks. 212; Atterbury's Correspondence, iv. 167.

MacGillivray, Paul Howard (1834–95): b. Aberdeen, 1834; d. Bendigo, Victoria, 9 July, 1895. Son of Prof. William MacGillivray. M.R.C.S. F.L.S., 1880. In Australia from 1855. 'Catalogue of Aberdeen pl.,' 1853. Journ. Bot. 1895, 383; Ann. Scott. Nat. Hist. 1895, 262; Proc. Linn. Soc. 1895–6, 42.

Malleson, Rev. Frederic Amadeus (1819–97): b. London, 19 June, 1819; d. Broughton-in-Furness, 14 Nov. 1897. Educated at Yverdon, Switzerland. B.A., Dublin, 1853: M.A., Dublin, 1860. Vicar of Broughton-in-Furness, 1870. Friend of Borrer. MS. 'Flora of Sussex.' Nature Notes, 1898, 54.

Mason, A. (1826–88): d. Grange-over-Sands, Lanc., 1888; bur. Cartmel Priory, Lancashire. Vet. Surgeon, of Grange, Lancashire. Once in army. List of pl. in Aspland's 'Guide to Grange,' 1869. Nat. 1894, 123.

Mason, Samuel (fl. 1800). Of Yarmouth. Collected and drew Seaweeds. 3 vols. of drawings at Kew. Journ. Bot. 1893, 281.

Mayo, Herbert (c. 1792–1852): b. London? circ. 1792: d. Bad-Weilbach, near Mayence, 15 Aug. 1852. M.R.C.S., 1819. M.D., Leyden. F.R.S., 1828. Prof. Anat. and Physiology, King's Coll., London, 1830. 'Observations on motion of . . . *Mimosa*,' Quart. Journ. Sci. ii. 1827, 76–83. Sachs, 550; R.S.C. iv. 313; 'Genealog. Account of Mayo and Elton Families,' 109, with portr. Mezzotint by David Lucas from painting by J. Lonsdale in Hope Collection, Oxford.

More, Alexander Goodman (1830–95): b. London, 5 Sept. 1830; d. Dublin, 22 March, 1895. F.L.S., 1856. F.R.S.E. M.R.I.A. Asst. Nat. Hist. Mus. Dublin, 1867; Curator, 1881–7. Contrib. to Phytologist, 1860–1; to Journ. Bot., 1864–93. Critical on *Viola*, *Batrachium*, &c. 'Cybele Hibernica' (with David Moore), 1864. 'Life and Letters,' by C. B. Moffat, 1898. R.S.C. iv. 416; viii. 435; x. 845; Jacks. 583; Journ. Bot. 1895, 225, with portr.; Irish Naturalist, May, 1895; Proc. Linn. Soc. 1894–5, 36.

Moseley, Henry Nottidge (1844–91): b. Wandsworth, Surrey, 14 Nov. 1844; d. Parkstone, Dorset, 10 Nov. 1891. M.A., Oxon, 1872. F.L.S., 1880. F.R.S., 1877. Linacre Prof., 1881. Naturalist, 'Challenger' Expedition, 1872, and collected plants. Memoir in his 'Notes by a Naturalist,' ed. 2, with portr. R.S.C. viii. 445; x. 859; Proc. Linn. Soc. 1890-92, 72; Boase; Dict. Nat. Biogr. xxxix. 176; Alumni Oxon.

Mueller, Sir Ferdinand Jacob Heinrich von (1825-96): b. Rostock, Germany, 30 June, 1825; d. South Yarra, Melbourne, 10 Oct. 1896; bur. St. Kilda Cemetery, Victoria. F.R.S. F.L.S., 1859. Baron (Wurtemberg), 1871. K.C.M.G. To Australia, 1847; appointed Govt. Botanist, 1853. Director Melbourne Bot. Garden, 1857-73. 'Eucalyptographia,' 1879. 'Fragmenta phytographiæ Australiæ,' 11 vols., 1858-81. Herbarium at Melbourne. Pritz. 226; Jacks. 584; Journ. Bot. 1897, 272 (portr.); R.S.C. iv. 515; viii. 459; x. 874; Proc. Linn. Soc. 1896-7, 60; Kew Bull. 1896, 218; Athenæum, 1896, ii. 530.

Mundy, Henry (1627?-82): b. Henley, Oxford, 1627?; d. Henley, 28 June, 1682. B.A., Oxon, 1647. Master of Henley Grammar School, 1656. 'Commentarii de Aëre vitali, Esculentis . . .' Oxford, 1680; ed. 2, 1685; London, 1681; Frankfort, 1685; Leyden, 1685; Hanover, 1687. Wood's Athenæ, ed. Bliss, iv. 49; Alumn. Oxon.; Journ. Bot. 1894, 109. *Mundia* Kunth.

Murton, Henry James (1855?-81): b. Cornwall, c. 1855; d. Bangkok, 1881. To Kew, 1872-3; Supt. Singapore Gardens, 1875-80; then with King of Siam at Bangkok. MS. Flora of Singapore (lost). 'Cat. Bot. Garden, Singapore,' 1879. Jacks. 452.

Nasmyth, Sir James (d. 1779): d. Philiphaugh, Peeblesshire, 4 Feb. 1779. Studied under Linnæus in Sweden. "Said to have made extensive collections." Dict. Nat. Biogr. xl. 115. *Nasmythia* Huds. = *Eriocaulon*.

Neckam, or **Necham, Rev. Alexander** (1157-1217): b. St. Alban's, Herts, Sept. 1157; d. Kempsey, Worcestersh., 1217; bur. Worcester. Master at Dunstable. Taught in Paris, 1180. Abbot of Augustinians, Cirencester, 1213. 'De Naturis Rerum,' in Latin elegiacs, dealing, *inter alia*, with plants, in Rolls Series. Dict. Nat. Biogr. xl. 154.

Needham, Rev. John Turberville (1713-81): b. London, 10 Sept. 1713; d. Brussels, 30 Dec. 1781; bur. Abbey of Condenberg. Educated at Douay; ordained priest, 1738. Microscopist. F.R.S., 1746-7. Pritz. 231; Jacks. 67, 219; Papers in Phil. Trans. Dict. Nat. Biogr. xl. 157; Life in Mém. Acad. Bruxelles (1783), iv. introd. xxxiii.; Nich. Illust. viii. 605; Anec. vii. 283, 635.

Owen, F. W. (fl. 1824). Captain R.N. In East Africa. "Innumeras plantas detexit," Bojer in Ann. Sci. Nat. 2 Ser. iv. 267. *Owenia* Hilsenb. = *Ceratogonum* Meissner.

Packe, Charles (1826-96): b. Prestwold, Leicestersh., 1826; d. Stretton Hall, Leicestershire, 16 July, 1896. B.A., Oxon, 1849.

F.L.S., 1870. Botanized in Pyrenees. 'Guide to Pyrenees,' 1862; ed. 1867, with bot. notes, especially on ferns. Herbarium at Cambridge. Jacks. 278; Alpine Journal, xviii. 236 (1896); Journ. Bot. 1897, 415; Proc. Linn. Soc. 1896–7, 66; Alumn. Oxon.

Parfitt, Edward (1820–93): b. East Tuddenham, Norfolk, 17 Oct. 1820; d. Exeter, 15 Jan. 1893. Gardener, afterwards Librarian, Devon and Exeter Institution, 1861–93. 'Devon Fungi,' in 12 vols., with 1530 col. drawings by himself, unpublished. R.S.C. iv. 756; viii. 561; x. 989; Journ. Bot. 1893, 160; Natural Science, 1893; Dict. Nat. Biogr. xliii. 205.

Parish, Rev. Charles Samuel Pollock (1822?–97): b. Dumdum, Calcutta, c. 1822; d. Roughmoor, Somerset, 18 Oct. 1897. B.A., Oxon, 1841. Chaplain at Moulmein, Burma, 1852–78. Orchidist. Contributed bot. papers to Journ. Asiat. Soc. Bengal. R.S.C. iv. 757; viii. 562; Journ. Bot. 1897, 464; Alumn. Oxon. *Dendrobium Parishii* Bateman.

Pascoe, Francis Polkinghorne (1813–93): b. Penzance, 1 Sept. 1813; d. Brighton, 20 June, 1893. F.L.S., 1852. M.R.C.S., 1835. Surgeon R.N. till 1843. Entomologist. Memb. Bot. Soc. London. 'Cornish Pl.,' Bot. Gazette, 1850. Correspondent of H. C. Watson. R.S.C. iv. 769; viii. 566; x. 996; Dict. Nat. Biogr. xliii. 435; Journ. Bot. 1893, 287; Proc. Linn. Soc. 1893–4, 33; Boase.

Pearless, Anne, *née* **Pratt** (1806–93): b. Strood, Kent, 5 Dec. 1806; d. Shepherd's Bush, London, 27 July, 1893; bur. East Grinstead Cemetery, Sussex; m. John Pearless, 1866. 'Flowers and their associations,' 1828. 'Field, Garden, and Woodland,' 1838 (anon.). 'Wild Flowers,' 1852, 2 vols. 'Flowering Plants of Great Britain,' 5 vols., 1855. Pritz. 252; Jacks. 594; Journ. Bot. 1893, 288; 1894, 205; Women's Penny Paper, 9 Nov. 1889, with portr.; Dict. Nat. Biogr. xlvi. 284; Boase.

Penny, Rev. Charles William (1838–98): b. West Ilsley, Berks, 1838; d. Wokingham, Berks, 30 March, 1898. M.A., Oxon, 1863. Assistant Master, Wellington College, 1861. 'Flora Wellingtonensis,' 1868. Contrib. to Journ. Bot. Journ. Bot. 1898, 208; Fl. Berks. clxxx.; Alumn. Oxon.

Pentland, Joseph Barclay (1797–1873): b. Ireland, 1797; d. London, 12 July, 1873; bur. Brompton Cemetery. Secretary to Consulate-general in Peru, 1827; Consul-general in Bolivia, 1836–9. Sent plants from Peru. R.S.C. iv. 820; Bot. Reg. 1839, t. 68; Dict. Nat. Biogr. xliv. 350; Boase. *Pentlandia* Herb. = *Urceolina.*

Perry, William Wykeham (1846?–1894): b. 1846?; d. 14 June, 1894. Commander R.N. Collected at Amsterdam Island, 1873; in Socotra, 1876; in Corea, &c., 1883. Plants at Kew. Kew Bulletin, 1894, 397. *Aloe Perryi* Baker.

Pope, Clara Maria (d. 1838): d. London, 24 Dec. 1838. Flower-painter to Horticultural Soc. Drawings of *Pæonia* (1821) in Bot. Dept. Brit. Mus. Dict. Nat. Biogr. xlvi. 130.

Porter, George (fl. 1800–34). Head-master Penang Free School,

1822. Superintendent of Government Bot. Garden, Ayer Hitam, till 1834. Collector for Wallich. Curtis Cat. Pl. of Penang, 1892, 99. *Dracæna Porteri* Baker.

Pratt, Anne. [*See* PEARLESS.]

Pursh, Friedrich Traugott (1774–1820): b. Tobolsk, Siberia, 4 Feb. 1774; d. Montreal, 11 July, 1820; bur. Montreal. Travelled twelve years in United States (1799–1811), and afterwards in Canada. In England, 1811–15. 'Verzeichniss der . . . Pflanzen,' 1799. 'Flora Americæ septentrionalis,' 1814. "Arranged materials for a Flora Canadensis." Edited ed. viii. and ix. of Donn's 'Hortus Cantabrigiensis,' 1815, 1819. Herbarium purchased by Lambert. D. Don, Account of Lambert Herb. 17; Sargent, 'Silva N. America,' ii. 39; Proc. Acad. Nat. Sci. Philadelphia, 1898, 13; Pritz. 254; Jacks. 594. *Purshia*, DC.

Quekett, Eliza Catherine. [*See* WHITE.]

Rae, John (1813–93): b. Clestrain, Stromness, Orkneys, 30 Sept. 1813; d. Kensington, 22 July, 1893; bur. Kirkwall. M.D., Edinb., 1833. LL.D. M.D., Montreal, 1880. F.R.S., 1880. Arctic explorer. 'Narrative of Arctic Expedition in 1846–7,' 1850. Portr. by S. Hodges in Museum, Stromness; bust by G. Maccallum in Edinb. Univ. Canadian Record of Science, v. 484; Dict. Nat. Biogr. xlvii. 152; Appleton, Cyclop. Americ. Biog., with portr.

Raffles, Sir Thomas Stamford (1781–1826): b. at sea, off Jamaica, 5 July, 1781; d. Highwood Hill, Middlesex, 4 July, 1826. Under-Secretary, Pulo Penang, 1805; Lieutenant-Governor of Java, 1811–16. 'History of Java,' 1817. Large collections lost at sea. Founded Zoological Society. Life, by D. C. Boulger, with portraits, 1898; D. Don, Account of Lambert Herb. 22; Trans. Linn. Soc. xiii. 228. Portr. Nat. Port. Gall. by Joseph. *Rafflesia* R. Br.

Ralph, Thomas Shearman (d. 1892?): d. Melbourne, 1892? A.L.S., 1842. M.R.C.S. Practised in Melbourne. 'Elementary Bot.,' 1849: ed. ii. 1862. 'Icones Carpologicæ,' 1849. Edited 'Opuscula Botanica' of Thomas Johnson, 1847. 'The Young Botanist,' 1865. R.S.C. v. 81; viii. 689; xi. 96; Pritz. 256; Jacks. 595.

Ramsay, Christina, Countess of Dalhousie (*née* **Broun**) (fl. 1805–33): m. George Ramsay, 9th Earl of Dalhousie, 1805. In Nova Scotia, 1816–28; in India, 1829–32. Hon. Member Bot. Soc. Ed. Collected extensively in Nova Scotia and Canada, and in Simla and Penang. Sent plants to Sir W. J. Hooker. "Rendered essential service to botany" (Dedication of vol. lx. Bot. Mag.). Herbarium of about 1200 species presented to Bot. Soc. Edinburgh. Fl. Indica, 70; Loud. Gard. Mag. i. 255; Proc. Bot. Soc. Ed. 1836–7, 50; 1838–9, 52. *Dalhousiea* Grah.

(To be continued.)

NOTICES OF BOOKS.

THE FERTILIZATION AND DEVELOPMENT OF FLORIDEÆ.

The Botanische Zeitung, for August, 1898, contains the results of an interesting investigation by Prof. Oltmanns, entitled "Zur Entwickelungsgeschichte der Florideen," with four plates. The Schmitzian theory—we may even say assertion—of a second act of fertilization in the development of the Floridean cystocarp has never been accepted with the same faith as the other conclusions of this lamented phycologist. This is only natural, since, as Prof. Oltmanns says, "If a double fertilization took place, what would become of all the theories of heredity &c." ? These considerations led Prof. Oltmanns to re-examine some of the algæ described by Prof. Schmitz, and his results show that in no case does any double act of fertilization take place. The first alga described in this paper is *Dudresnaya purpurifera*, as being a well-known example of those algæ which produce ooblastema-filaments; and the development of the fruit is followed from the earliest stages. This has of course been described and figured by Messrs. Bornet and Thuret and others, but till now the further conduct of the sporogenous nucleus has never been accurately followed. By the term "sporogenous nucleus" (sporogener Kern) Prof. Oltmanns designates the nucleus which is the result of the fusion between the male nucleus of the spermatium and the female nucleus of the carpogonium. On the behaviour of this sporogenous nucleus hangs the decision whether or no a secondary act of fertilization takes place—provided always, that "fertilization" is understood to involve a fusion of nuclei.

The fertilized carpogonium of *Dudresnaya purpurifera* begins to swell, and to produce certain outgrowths which are called by Prof. Schmitz "ooblastema-filaments." This term is discarded by Prof. Oltmanns, as indicating the idea of fertilization, and his own new term "sporogenous-filaments" is used instead. From the fertilized carpogonium there grow out then 2–3 sporogenous-filaments, one at each side and sometimes a third in the middle. These grow downwards towards the terminal cells of the small *Callithamnion*-like branches, which have grown out from the axis of the carpogonial branch. Fusion takes place between the sporogenous branch and the terminal, as well as the subterminal, cells of these branches—the auxiliary-cells. As is shown by the figures, that portion of the sporogenous-filament which fuses with the auxiliary-cell is cut off by a cell wall. The protoplasm of the sporogenous cell fuses with that of the auxiliary-cell, but so far from there being any fusion of the two nuclei, there appears to be a desire on the part of the auxiliary-cell nucleus to shrink away as far as possible from the sporogenous nucleus. Before the cell fusion takes place, the nuclei of the auxiliary-cells are in the middle of their respective cells; but so soon as the dividing walls are broken down, the auxiliary nucleus (if one may use the term) flees before the sporogenous nucleus to the most distant corner of its cell. This was found to occur in every specimen examined by Prof. Oltmanns.

The sporogenous nucleus, after remaining for a while in the centre of the fused cell, moves outwards towards the sporogenous half of the cell, which at the same time begins to grow out into a slight protuberance. Here the protoplasm then congregates, leaving the auxiliary nucleus almost bare at the far end of the cell. This protuberance grows out into the new sporogenous-filament, which then works its way between the vegetative branches of the thallus. This is the order of growth for the two outer sporogenous-filaments, arising from the fertilized carpogonium; the middle filament, when present, fuses with cells which lie in the middle of the carpogonial branch and also with cells which arise as off-shoots from the pinnæ described above. This shows, as Prof. Oltmanns points out, that though the terminal cells of the pinnæ are more especially adapted to form auxiliary-cells, almost all the cells of the carpogonial branch are capable of taking on this character, although the terminal cells appear to possess a special quantity of food material.

Now to follow the further development of the sporogenous-filaments. They grow out, as is well known, towards the terminal cells of side-branches which arise at the base of the ordinary vegetative branches. The terminal cells of these side-branches are slightly different in appearance from the other cells of the same branch and the sporogenous-filament works its way towards this terminal cell and fuses with it. Division of the sporogenous nucleus has previously taken place, and while one sister-nucleus is carried on by further growth of the sporogenous-filament to other auxiliary-cells, the other remains in the fused cell which is now cut off from the sporogenous-filament by a cell-wall. The behaviour of the two nuclei, that from the sporogenous-filament and that of the original auxiliary-cell, now together in the fused cell, is exactly the same as that described above in the fusion of the sporogenous-filament and the auxiliary-cell of the carpogonial branch. The sporogenous nucleus remains where it was left after subdivision, that is, at the junction of the sporogenous-filament and the auxiliary-cell, while the auxiliary nucleus gives the idea of being driven back against the further wall of the auxiliary-cell. As the fused cell increases in size, so the auxiliary nucleus decreases. Again, as before, the protoplasm of the fused cell gathers round the sporogenous nucleus, which then divides into two. Immediately cell-division takes place across the fused cell, between the two sporogenous sister-nuclei; and while one nucleus wanders to any part of the fused cell, the other departs to the furthest end of the cell which is cut off from the main mass of the fused cell. This newly formed cell, of purely sporogenous origin, except for any protoplasm which may possibly have entered from the auxiliary-cell, divides up and forms the spores. The development of these is of course well-known.

It is seen therefore that though there is absolutely no fusion of nuclei after the first act of fertilization, yet no further development takes place from the junction of the sporogenous-filament and the auxiliary-cell, unless a sporogenous nucleus is left behind in the auxiliary-cell. Prof. Oltmanns points out that according to Prof.

Schmitz the fusion is confined to the two masses of protoplasm, while the nuclei remain separate; but from his writings and drawings it can be seen that he overlooked the auxiliary nucleus in later stages and confused it with that of the sporogenous-filaments.

The next plant examined in the same minute manner is *Dudresnaya coccinea.* The general development of the fruit is well-known, but the behaviour of the nuclei is here clearly explained for the first time. It differs from that of *D. purpurifera* in several details, such as the division of the auxiliary-cell nuclei, which does not occur in *D. purpurifera.* The same extraordinary influence however appears to be exercised in these auxiliary nuclei, by the sporogenous nucleus, for both auxiliary nuclei are found after fusion, even indeed in the oldest cystocarps, closely pressed together and hardly moving from their position at the far end of the cell. The auxiliary nuclei in *D. coccinea* do not diminish in size as in *D. purpurifera.* The formation of the "gonimo-lobes" is described. The sporogenous nucleus divides twice to form the two lobes, but though there always remains a sporogenous nucleus in the auxiliary-cell which bears, and gives rise to, these two gonimo-lobes, Prof. Oltmanns has never seen more than two lobes in each fruit.

This is more or less the same result at which Prof. Schmitz arrived, but his description of the behaviour of the nuclei was not clear, and it may be doubted if he had fully grasped the details of the subject.

The next plant examined by Prof. Oltmanns is *Glœosiphonia capillaris,* of which Prof. Schmitz wrote: "It may well be maintained that the nucleus of the ooblastema-cell fuses with that of the auxiliary-cell, since after the emptying of the ooblastema-cell only a single nucleus is present in the auxiliary-cell." Prof. Oltmanns shows that this statement is incorrect. After fusion of the sporogenous-filament and the auxiliary-cell, the auxiliary nucleus divides into two, and these two sister-nuclei move later towards the centre of the fused cell, where they may be found close to the sporogenous nucleus. Thus in every case there are at least two nuclei in the cell which results from the fusion of the sporogenous-filament and auxiliary-cell. The only instance of a single nucleus being found in an auxiliary-cell, after contact with the sporogenous-filament, is after so-called "blind fusion," where the sporogenous nucleus does not enter the auxiliary-cell, and consequently no further development or growth takes place. This has been seen by Prof. Oltmanns in *Dudresnaya* and *Glœosiphonia.* In such cases the contents of the auxiliary-cell nucleus are denser than usual, and the sporogenous-filament after leaving the auxiliary-cell is as a rule much branched.

Prof. Oltmanns maintains with decision that in *Glœosiphonia,* as in *Dudresnaya*, there is absolutely nothing to justify the theory of a second act of fertilization, so far as fusion of nuclei goes.

An interesting point occurs in connection with the outgrowth of the auxiliary-cell after fusion with the sporogenous-filament. In *Dudresnaya* this cell begins to swell out at the point where the sporogenous-filament came into contact with the auxiliary-cell, and Prof. Oltmanns draws a comparison between this and the forced growth of cells resulting from the invasion of a fungal energid. He recommends further investigation of this point.

Callithamnion corymbosum and *Dasya elegans* are then described as regards the development of their fruit. The auxiliary-cell nucleus of *D. elegans* shows no such desire to flee from the sporogenous nucleus as in the case of *Dudresnaya*; the two nuclei remaining contentedly near each other as in *Glœosiphonia*.

It is pointed out that there is a striking resemblance between the fusion of the sporogenous-filaments and the auxiliary-cell on the one hand, and the behaviour of the pericentral cells of *Polysiphonia*, described by Prof. Rosenvinge, on the other (Bot. Tidsskrift, xiv. 11 (1884); xvii, 10 (1888)). The nuclei of the pericentral cells, situated at some distance from the apex, divide, and a small cell is cut off at the outer corner. This small cell then fuses with the pericentral cell immediately below it, and the nucleus of the small cell passes over into the pericentral cell.

After describing the five different types mentioned above and the behaviour of the nuclei in the formation of their fruit, Prof. Oltmanns proceeds to draw up a table showing the order of classification of the *Florideæ*. As he says himself, this does not differ materially from that of Prof. Schmitz. His points of difference with that author, as well as with Prof. Hauptfleisch and Prof. Bradley Davis, are dealt with, and a full explanation is given of his systematic table. This table only takes into consideration the sporogenous-filaments, cells and nuclei, without equal regard to the manifold varieties in origin and position of the auxiliary-cells. If this side of the question were taken into account, a new system of classification would be rendered necessary. The present system is therefore one-sided. Prof. Oltmanns' own feeling about the matter is, that the position and development of the auxiliary-cells differ according to the needs and peculiarities of various species; and this view seems to him to be all the more likely considering the tendency to fusion throughout all the Florideæ. This tendency arises possibly from the necessity of facilitating transmission of food-material more thoroughly than could take place through the cell-membrane; though the fusion may also act in some cases as a convenient form of anchorage.

The systematic classification of Prof. Oltmanns is founded, as said above, on the sporogenous threads and their development, if one may use the term development for a growth which works backward. At the bottom of the system the sporogenous-filaments are longer and wander further than in the more highly developed groups such as *Rhodomeleæ*, where the auxiliary-cells are so closely connected with the carpogonial branch as to be only separated from it after fertilization has taken place. Thus the sporogenous-filament is so shortened that it is hardly possible to apply the term to the short outgrowth which fuses with the auxiliary-cell.

Prof. Oltmanns likens the fusion of sporogenous-filament and auxiliary-cell to the parasitism of many fungi. The sporogenous energid invades a cell, forces the nucleus of that cell to retire, draws to itself the protoplasm of the host-cell, and finally subdivides to form new cells in which it makes use of the cell-wall of the host. This is best seen in *Glœosiphonia*, where the sporogenous energid takes full possession of the auxiliary-cell, so as to render the original cell-contents unrecognisable; at the same time causing protuberances to swell out in the wall of the host.

Prof. Oltmanns concludes his paper with a comparison between *Florideæ* and other plant groups, founded on the theory of alternation of generations. He likens this parasitism on the part of the sporogenous-filaments to the apparent parasitism of the non-sexual on the sexual generation of mosses; and draws attention to the fact that the sporogonia of *Muscineæ* and the sporogenous-filaments of *Florideæ* are in part able to support themselves. Prof. Oltmanns adds that he does not hold with any sharp distinction between the two generations since fresh investigations may shortly cause botanists to change their views on this point; but he is anxious to show that comparisons may be drawn between the higher groups of *Thallophytes* and the *Muscineæ*. This does not necessarily mean a relationship, but rather a development on parallel lines. The views of Profs. Nägeli and Pringsheim are given on this point, and then the likeness to the *Ascomycetes* is shown, with references to some of the many writers on the subject. Prof. Oltmanns says: "If a relationship between the *Florideæ* and the *Ascomycetes* should ever be proved, that does not in any way remove the difficulty of linking the *Florideæ* with lower groups of algæ. That *Coleochæte* can scarcely be considered such a link, I have lately tried to show; and also among other algæ I can find no satisfactory connection; the *Florideæ* must therefore remain for the present as an archetype, using the word in the Sachsian sense."

Finally, after a very short summary, Prof. Oltmanns winds up his paper with the words: "A double fertilization such as Prof. Schmitz wished to prove does not therefore occur in the Florideæ."

E. S. B.

Orchidacearum Genera et Species. Exposuit FRITZ KRAENZLIN. Vol. i. Fasc. 4–8. 8vo, pp. 193–512. Berlin: Mayer & Müller. 1897—July, 1898.

FASCICLES 1–3 of this work were reviewed in this Journal for 1897, pp. 493–495, where we drew attention to the unsatisfactory character of the literary side of the work, and other signs of too hasty production. A similar criticism may be made on the parts now before us. We fear that Dr. Kraenzlin has undertaken a task for which, however competent he may be, he has not sufficient leisure to carry through successfully. Orchids are a large family, the genera need careful consideration, and we think Dr. Kraenzlin would have done better to have followed the example which has proved so successful in Engler & Prantl's *Pflanzenfamilien*, and have sought the aid of other botanists. By a judicious distribution of the tribes or genera the work might have been done better and in reasonable time.

Except for new species and a few trifling alterations in arrangement, there is little of novelty to call for remark in the fascicles now under review. They are almost exclusively devoted to the genus *Habenaria*, which the author has recently monographed, and which would presumably not need much revision. The sections proposed are, with small differences, those under which Dr. Kraenzlin arranged the species in Engler's *Jahrbuch*, xvi. (1892). The thirty-four sections are reduced to thirty-two by the union of *Replicatæ* (4) and *Bilabrella* (6), and of *Seticaudæ* (32) and *Stenochilæ* (33); the section *Acuiferæ* also disappears, while Hooker's *Plectoglossa* is adopted from the *Flora of British India* for the Indian species *H. Perottetiana.* The section *Ceratopetalæ* might also have been united with *Replicatæ;* the diagnosis of each is exactly the same, and they contain identical species. For instance, *Habenaria Welwitschii* (*Ceratopetalæ*) and *H. cataphysema* (*Replicatæ*) of Reichenbach fil. are indistinguishable. The sections as a whole seem too artificial, and other instances of wide separation of nearly allied plants might be mentioned. Thus the South African *H. foliosa* and the Angolan *epipactidea*, both of Reichenbach fil., are hardly specifically distinct, the tropical plant being smaller, with laxer habit, less blunt leaves, and smaller bracts; the floral structure is identical, except for the slightly narrower, more oblong lateral petals of *H. epipactidea.* But while the latter comes in Section 20 (*Chlorinæ*), *H. foliosa* is found in *Seticaudæ*, which is No. 31 in the clavis, but 30 in the text, from having changed places with *Odontopetalæ.* It is matter for regret that so many of the Brazilian species published by Sr. Barbosa Rodrigues in his Gen. & Sp. Orch. Nov. should, owing to absence of material and insufficient diagnosis, have to be considered apocryphal.

Besides the completion of *Habenaria*, the last fascicle includes the small Indian genus *Diplomeris*, *Cynosorchis*, *Barlæa* (*B. calcarata* Rchb. f.), and part of *Peristylus.*

As the date 1897 is printed on the cover of each part, and as some confusion has arisen in the issue of parts 7 and 8, future systematists will be glad to find a record of the dates on which the Department of Botany received each fascicle; these dates probably fairly coincide with the exact date of issue:—

Fascicle 1, received Aug. 24, 1897.
,, 2, ,, Sept. 15, 1897.
,, 3, ,, Nov. 9, 1897.
,, 4, ,, Dec. 14, 1897.
,, 5, ,, Jan. 19, 1898.
,, 6, ,, April 19, 1898.
,, 8 (issued in error as 7), received June 28, 1898.
,, 7 (,, ,, 8), ,, July 12, 1898.

A. B. Rendle.

Studien über die Protoplasmaströmung bei den Characeen. Von Dr. Georg Hörmann. Jena. Gustav Fischer, 1898.

Dr. Hörmann gives us in this memoir the results of a number of observations he has made upon rotation in the cells of the *Characeæ*. So far as concerns the group in question, he accepts De Vries's view that protoplasmic movement is a means whereby mingling and transport of substances is brought about. The effect of streaming upon the development of organs, he maintains, contrary in part to A. Braun's conclusion, to be as follows:—that the same relation holds in the case of both leaves and rhizoids, the earliest developed cells in both cases being those arising at a point towards which the stream is directed. The direction of streaming is held to be in close connection with nutrition: thus the stream mounts along the outer (abaxial) side of the young leaf-cell, and by this means nutritive matters are most quickly conveyed to that part of the cell (*i. e.* the better illuminated) where they are principally required; as the leaf expands, the inner (axial) side of the cell becomes in turn the better illuminated, and the cell being by this time able to contribute its quota of elaborated matters, the streaming favours transport of such matters out of the cell by the shortest possible route. Moreover the direction of streaming—from end to end—in the elongated cortical cells affords the most favourable means for the products of katabolism to pass from the internal cells and escape into the surrounding water.

Velten's doctrine, that the rotating protoplasm always takes the path of least resistance, is one which has found general acceptance. Dr. Hörmann, however, endeavours to show that this doctrine does not apply to all cells of the *Characeæ*. In long cells, circular in section, movement in the direction of least resistance should, he argues, be circular movement and not longitudinal; and this is correct if the friction generated by contact between the moving and the stationary protoplasm be alone taken into account. The point overlooked by Dr. Hörmann is the greater momentum acquired by a rectilinear streaming as contrasted with that acquired by a curvilinear one; and if this difference in momentum exceeds in amount the extra retardation due to friction experienced by the stream when flowing over angular portions of the cell, the path of least resistance will lie from end to end of the cell. Moreover, we do not see why there should be any necessary antagonism between Velten's doctrine of "least resistance," and Dr. Hörmann's of "shortest way"; for, though inclined to accept them both, we do not think that the physiological advantage would be gained in any way not involving the least expenditure of force.

Dr. Hörmann agrees with those who consider the movements of such chlorophyll corpuscles as happen to fall into the stream to be "active" movements, and he claims to have set the question definitely at rest. But to us the two cases he cites do not seem at all conclusive. The best one, namely, three rotating corpuscles enclosed in a large clump of plasma, might be explained on the supposition that a small quantity of protoplasm, not yet deprived of motility, had become enclosed in the clump, a supposition rendered probable by Dr. Hörmann's admission that streaming had not yet ceased in the cell under examination. Moreover, the nature of the movement exhibited by these corpuscles, namely, a changeable plane of rotation but a constant direction, is precisely that of bodies moving passively in a stream of varying volume but fixed direction—such a stream, in fact, as one sees in the cells of the *Characeæ*.

The latter part of the memoir is devoted to a study of the effect of mechanical, thermal, imbibitional, and electrical stimuli upon the streaming movement. Undoubtedly the most valuable portion of this part, and indeed of the whole memoir, is that dealing with electrical stimulation. By a series of delicate experiments, revealing in unmistakable fashion Dr. Hörmann's gift as a skilful manipulator, phenomena similar to those exhibited by nervous and muscular tissues were obtained with *Nitella* cells, including a latent period, electrotonus, continued excitation through katelectrotonus, cumulative effect of inefficient stimuli, and negative variation of the current. Dr. Hörmann regards the two layers of the protoplasm as endowed with opposite electrical qualities, the resting layer being positive, the streaming layer negative; the two layers do not form a continuously electrified surface, but areas electromotorically effective alternate with others electromotorically indifferent, and the whole apparatus may be viewed as forming a series of small galvanic elements ranged side by side. The conclusion is that a nerve fibre, a muscle fibre, and a *Nitella* cell agree in possessing an irritable substance, to which is added, in the case of the muscle fibre, a substance giving the phenomenon of contraction, and in the *Nitella* cell that of streaming.

S. M.

Mykologische Untersuchungen aus den Tropen. Von Dr. Carl Holtermann. Pp. viii, 122, tab. xii. Berlin: Borntraeger. 1898. Price 25 Mark.

The chief value of this painstaking and excellent work is the criticism it furnishes of the Brefeldian system. The author states quite frankly, and I fancy most people will agree with him, that, in spite of the enormous accumulation of material since De Bary's time, we have yet made no advance on his system of classification. His journey to the tropics, extending to fourteen months in Ceylon, Java, Borneo, and the Straits Settlements, has furnished him with a large amount of material for work which engaged him in interesting and prolonged cultural experiments. A selection from these results has been made, and published in this well-printed and illustrated memoir. It would take too much space to give anything like an adequate account of the details of his researches, but there are conclusions to which he comes that are of general interest. During the forty years in which the artificial culture of fungi has been practised with success by such masters as De Bary, Tulasne, Brefeld, and others, much, as everyone knows, has been done in laying bare life-histories of the different types, but the method has done very little towards settling questions of wide bearing on the relationships of the groups of fungi to each other. It remains exceedingly improbable that much will ever be discovered in this direction, since we cannot penetrate the remote past, and Dr. Meschinelli's labours in collecting the evidence of fossil fungi show us how blighted must be any hopes in that field.

The most interesting part of the memoir relates to the author's evidence on the relationships of the resupinate forms of *Polyporei* to the typical forms and indeed of the groups of *Basidiomycetes*, especially the *Auricularieæ*, *Tremellini*, and *Dacryomycetes*.

He has exceedingly interesting remarks on the comparison of tropical and temperate fungi, the large number common to both climes, the relative abundance of species and of individuals. His methods of culture and improvements (for the tropics) on those already well known are of no less help and interest. By this excellent and sound piece of work Dr. Holtermann steps at once into a high place among investigators of fungi, though whether the Brefeldian school will accept some of his dicta gratefully is much to be doubted, and on this account he may have less honour in his own country for a season—a short one, we hope.

G. M.

Monographie des Caulerpes. Par Madame WEBER VAN BOSSE. Extr. des 'Annales du Jardin Botanique de Buitenzorg,' vol. xv., pp. 243–401, plates xx.–xxxiv.

IT would be hard to conceive of anything better done than this admirable monograph of one of the most interesting of plant genera. While the limits of the genus are marked by its unique vegetative structure, the species are in many cases hard to discriminate. There is probably not another case among plants at all comparable with that of *Caulerpa*. A large genus of wide distribution in the warm shore waters right round the tropical and subtropical belt, varying in its forms, which markedly recall the outward appearances of such diverse land plants as cacti, Naias, cypress, heaths, clubmosses, mosses, &c. and of most plentiful occurrence, we yet know absolutely nothing of any reproduction except by probable vegetative proliferations. The authoress's method has been on the whole guided by a laudable tendency to reduce the species by clubbing them, either on the head, or together, and in almost all cases they (or their authors) have deserved the treatment. I cannot help thinking (apart from personal feelings) that she has carried her method rather far in the case of *C. paspaloides*, into which she has reduced my *C. phyllaphlaston*. An inspection of plate xxx. shows at a glance the method by which she has established the links to her satisfaction. I am not convinced. The only omission is a grave one, *viz.* that of an index, which I hope will be supplied with the complete volume of the *Annales.*

Finally, I have nothing but praise for the admirably thorough manner in which Madame Weber van Bosse has worked her way steadily through the genus. Her plates are excellently rendered, and illustrate the striking points of structure in a carefully selected style.

G. M.

Eléments de Botanique. Par Ph. Van Tieghem. Troisième édition revue et augmentée. 8vo. Vol. i.—Botanique générale, pp. 559, figs. 235; vol. ii.—Botanique spéciale, pp. 612, figs. 345. Paris: Masson & Cie. 1898.

Teachers and students of botany in this country will find much to interest them in Prof. Van Tieghem's text-book, as well as a considerable diversity from the method of treatment of the subject to which they have become accustomed. The book is issued in two neat and handy volumes, a practice which we would recommend to English publishers, who do not always realize what a comfort it is to have books light enough to hold in the hand whilst reading. At the same time we would criticise severely a practice which no respectable publisher should tolerate, we mean that of borrowing figures without acknowledgment. In the present case the author has borrowed extensively, but there is nowhere any indication that the illustrations are not original.

The first volume is a general account of the morphology and physiology of plants, in which the most striking feature is the joint consideration of the two aspects. Thus Chapter I., "The Plant-body," falls into two sections—the first a general morphological review of the plant, its external and internal differentiation into members and tissues, and its modes of reproduction; the second an introduction to the study of functions and relation to environment, or physiology. The next chapters deal successively with root, stem, leaf, and flower, in each case from first a morphological, secondly a physiological, point of view. In Chapters VI., VII., VIII., and IX., the course of development in Phanerogams, Vascular Cryptogams, Muscineæ, and Thallophytes is successively treated; while the tenth and last chapter is entitled "Development of the Race." The whole forms a concise and well-arranged introduction to the study of plants.

It is in the second volume that one finds the most striking departures from generally received views. The four usual groups, Thallophytes, Muscineæ, Vascular Cryptogams, and Phanerogams, are recognised, and there is little to call for remark in the subdivisions of the first three. We may note that the *Myxomycetes* form the first order of Fungi; and *Oomycetes*, *Basidiomycetes*, and *Ascomycetes* the other three. Bacteria are found with the Algæ as a family of *Cyanophyceæ*. Without doubt they are thus placed with their nearest allies, but there is something to be said for the separation of these lowly organised plants, with and without chlorophyll, as a distinct group—*Schizophyta*—at the bottom of the series, to be followed by the Algæ proper, and then their derivatives the Fungi. The subdivision of Group IV., on the other hand, calls for some criticism. The two primary divisions—owed to Robert Brown—into Gymnosperms and Angiosperms are too fundamental to be tinkered with. The insertion of an alternative, "Astigmatées" and "Stigmatées," is to insist unnecessarily on an obvious but minor point of detail; and a similar criticism will apply to a character by aid of which the Angiosperms are separated into three classes, even though that character should prove to be general. The three classes are entitled "Liorhizes Monocotylées ou Monocotylédones," "Liorhizes Dicotylées," and "Climacorhizes ou Dicotylédones." That is to say, the primary character is taken from the manner in which the young root loses its root-cap, whether the latter comes off clean (Liorhizes), leaving the functions of piliferous layer to be performed by the outer layer of the cortex, as in Monocotyledons and most *Nymphæaceæ*, or whether, as in the rest of the Dicotyledons, the most internal layer of the epidermis remains to produce the root-hairs after the exfoliation of the outer layers as the root-cap. The term "climacorhizes" refers to the step-like appearance at the root-tip, resulting from the peeling off of a gradually lessening number of layers of root-cap from below upwards, and will be understood on reference to a figure of the growing-point. The result is to separate the grasses from the Monocotyledons, and the *Nymphæaceæ* from the Dicotyledons, and unite the two families into an intermediate class. The second cotyledon of the grasses is found in the projection which sometimes occurs on the axis on the outer side of the embryo. Such an arrangement might provide excellent material for discussion at an evening meeting of a scientific club or society, but is distinctly out of place in a comparatively elementary text-book. *Gramineæ* form a well-defined and natural family, which is perhaps less closely allied to the *Cyperaceæ* than a student would be led to imagine from their close approximation in a systematic arrangement, but to remove them completely from Monocotyledons and to unite them with the polypetalous acyclic-flowered water-lilies is to ignore floral and other characters which have been held to be among the highest in value. The author shows a similar want of appreciation of relative value of characters in making four orders of Monocotyledons and placing *Juncaceæ*, *Liliaceæ*, and *Amaryllidaceæ* in separate orders. Similar criticism will apply to the subdivision of Dicotyledons, which depends entirely on degrees of differentiation of the ovule. Five orders, including a large number of small families, the names of many of which will sound strange to English teachers and students, but among which will be found *Loranthaceæ*, *Santalaceæ*, and *Balanophoreæ*, are separated as Sub-class I.—"Inséminées." The great majority are considered to have seeds, and form Sub-class II.—"Séminées"—which fall into two orders, according to the presence of a single or double integument in the ovule. The result is that while the smaller groups are generally fairly natural in themselves, nearly allied families are often widely separated, as, for instance, *Castanaceæ* (including oak and sweet chestnut) from *Corylaceæ* and *Betulaceæ*. It is as if an attempt had been made to arrange the different families in a scheme of three dimensions, which by a process of flattening and reduction to a linear series has become egregiously distorted.

A. B. Rendle.

A Text-book of General Botany. By Carlton C. Curtis, A.M., Ph.D., Tutor in Botany in Columbia University. New York and London: Longmans, Green & Co.

The present age is verily one of text-books, some bad, very few good, and the vast proportion merely mediocre. There are many points in Dr. Curtis's book which raise it above the dead level of the ordinary productions of its class; its plan is good, the insistence on, and directions for, laboratory practice are admirable, and the numerous illustrations are for the most part excellent.

In the preface the author expressly states that the book is intended to be used in conjunction with lectures, and this forestalls a criticism which would naturally occur to anyone glancing over its pages, *viz.* that a considerable range of knowledge on the part of the student is taken for granted—much more indeed than the character of the book would appear at first sight to warrant.

We have come across some misleading statements here and there. Thus Robert Hooke did not, at any rate at first, discover his cells in charcoal, but in bottle cork; it was not to Von Mohl, but to Cohn Brücke and M. Schultze, that we are indebted for the recognition of the identity and importance of protoplasm in both animals and plants. To Von Mohl, it is true, belongs the credit of having first recognised in plants the formative nature of protoplasm, but the name had been used some years before by Purkinje. It is not, we think, desirable to ticket off so important a discovery as that of the existence and significance of protoplasm (as is so often done) under "Von Mohl, 1846." Like all other great discoveries, it was the work of many investigators; and others, *e. g.* Du Jardin, had already before 1846 apprehended its nature amongst animals in the substance he termed sarcode. And the plea for a more adequate treatment of this particular discovery may be the more reasonably urged inasmuch as the main threads are comparatively easy to trace, and the student is furnished with an admirable example of the origin and growth of a scientific discovery, the importance of which it is hardly possible to exaggerate. On the whole, we are not much impressed with the chapter on the cell. It seems to have been compiled in rather a hurry, and the somewhat frequent misprints (not always the fault of the printer) point in the same direction.

It is a matter for regret that in this, as in so many modern text-books, the external morphology of the plant meets with such scanty recognition. The student is invited to a feast of pickles and physiology—very good in their way—whilst he is allowed to neglect the weighty matters of habit, adaptation, and variation of plants. And this in spite of the truth that it is in the philosophy of form that one can often read most clearly the reason of that minute internal structure so dear to the heart of the microscopist.

The systematic part of the book occupies about three-quarters of the whole. It is this portion which especially requires extensive subsidies at the hands of the teacher. The *Florideæ*, for example, cannot possibly be treated intelligibly within a space of six pages, even when illustrated by several excellent figures.

The tables of relationship of the various groups of Fungi strike us as exceedingly artificial, *e.g.* the important position assigned to the *Chætocladiaceæ*. Of course the tables are not insisted on as indicating more than possible affinities, often based on the most superficial resemblances, as, for example, when the *Coleochætaceæ* figure as the starting-point for the whole of the *Bryophyta*, but they have a mischievous tendency to mean a good deal more to students than they often do to their authors. But they are after all perhaps necessary evils; the danger is that they too often prove whited sepulchres also.

The treatment of Angiosperms, somewhat on the type-system, is brief but rather good, and might perhaps with advantage be extended in dealing with the unwieldly mass of forms included in this group.

On the whole, the book is one to which it is possible to extend a welcome. No one can hope to write within the limits of three hundred and forty-seven pages a text-book on so extensive a subject as botany which will please everybody; but Dr. Curtis has at any rate succeeded in performing his self-imposed task better than many others before him have done.

J. B. F.

Fungorum Fossilium Omnium, &c. *Iconographia* Doct. ALOYSIUS MESCHINELLI. Sump. Auct. typis Aloysii Fabris & C. Vicetiæ. 1898. Pp. xx, 144, tab. xxxi. Price 24s. net.

WE gravely doubt whether this work was worth doing in such an elaborate way as the author has chosen. By far the greater part of these so-called fossil fungi are mere markings on fossil leaves, and nothing more. To take them so seriously as to illustrate them in a number of expensive plates is surely an error of judgment. There is not only no evidence that a large number of these forms are, or have been, fungi; there is at least a strong presumption in some cases that the markings are due to other causes. For example, *Sclerotites Salisburiæ* Mass., figured on plate xxviii., is most probably only impressions of glands in the leaf of *Salisburia*, if we may bring the evidence of living *Salisburia* to their interpretation. The author has displayed so much ingenuity and perseverance in collecting this mass of rubbish, that we wish him a more fortunate task next time.

G. M.

ARTICLES IN JOURNALS.[*]

Bot. Centralblatt (Nos. 40–43). — B. Schmid, 'Bau und Funtionen der Grannen unserer Getreidearten' (2 pl.). — (No. 41). P. Knuth, 'Beiträge zur Biologie der Blüten.'—(Nos. 42–3). A. C. Hof, 'Histologische Studien an Vegetationspunkten' (2 tab.).—

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[*] The dates assigned to the numbers are those which appear on their covers or title-pages, but it must not always be inferred that this is the actual date of publication.

(No. 42). P. Knuth, 'Ueber den Nachweis von Nektarien auf chemischem Wege.'— N. C. Kindberg, 'Ueber die Systematik der pleurocarpischen Laubmoose.'

Bot. Gazette (17 Sept.). — J. M. Coulter, 'Origin of Gymnosperms and the seed habit.' — F. De F. Heald, 'Regeneration as exhibited by Mosses' (2 pl.).—F. C. Harrison, 'Bacterial contents of hailstones.'

Bot. Zeitung (1 Oct.). — W. Belajeff, 'Ueber die männlichen Prothallien der Wasserfarne (Hydropterides)' (2 pl.).

Bull. de l'Herb. Boissier (8 Oct.). — F. Stephani, 'Species Hepaticarum.' — R. Schlechter, 'Monographie der Disperideæ.' —A. de Coincy, 'Burgos au point de vue botanique.'—G. Gaillard, '*Rosa pimpinellæfolia* × *rubrifolia*.' — H. Christ, 'Filices novæ.'— R. Chodat, *Polygala Cabræ*, sp. n.

Erythea (22 Sept.).—S. B. Parish, 'Plants of S. California.'

Gardeners' Chronicle (8 Oct.). — G. Massee, *Puccinia Hieracii* (fig. 77).—W. B. Hemsley, '*Cactaceæ* of Galapago Islands' (fig. 75).

Journal de Botanique ("16 Juin," received 13 Oct.). — —. Hue, 'Causerie sur les *Parmelia*' (cont.). — A. Franchet, 'Plantarum sinensium ecloge secunda.' — ("1–16 Juillet," received 21 Oct.). P. Van Tieghem, 'Structure de quelques ovules.' — A. Franchet, 'Plantarum sinensium' (cont.).

Malpighia (fasc. v.–viii.; received 22 Oct.).—A. Colozza, 'Contributo all' anatomia delle Alstroemeriee' (2 pl.). — D. Saccardo, 'Contribuzione alla micologia Veneta e Modenese' (2 pl.). — C. Avetta, *Chara Pelosiana*, sp. n.

Oesterr. Bot. Zeitschrift (Oct.). — F. Czafek, 'Ueber einen interessanten Fall von Arbeitstheilung an Laubblättern.' — J. Celakovsky, 'Ueber petaloide Staubgefässe von *Philadelphus* und *Deutzia*.' — W. Lipsky, 'Über *Seseli Lehmanni*.' — K. Fritsch, 'Ueber einige hybride Caryophyllaceen.' — V. Schiffner, 'Neue Moose der böhmischen Flora.' — J. Rick, 'Zur Pilzkunde Vorarlbergs' (concl.). — J. Murr, 'Die Piloselloiden Oberösterreichs' (concl.).

BOOK-NOTES, NEWS, &c.

At a recent botanical examination of the Civil Service Commission the following appeared among the questions: "Give a brief account of the general influence of Kew on the development of botany." It seems to us that such a question was out of place, as it presupposed an extensive knowledge of matters which hardly come within the limits of a simple botanical examination. We assume, of course, that only the Royal Gardens are intended, but it would be difficult to give, in the limits of an ordinary answer, anything like a full account of their influence on botany, from the days of the Aitons to the culminating period of the Hookers.

We fancy, however, that it must be one of the candidates at this examination who contributes a letter to the *Gardeners' Chronicle* for Sept. 24. "These beautiful gardens," he says, "are a credit to the nation and to those who manage them, and are also a boon to the general public, making Kew and the neighbourhood an attractive residential district. As a public park for the masses, Kew is unrivalled. As a botanical college for students and scientific gardeners, it cannot be surpassed. The question, however, to ventilate is, does it spread among intellectual people generally as much botanical knowledge as it might be made to do?" This question the writer answers in the negative, mainly, it would seem, because, "if an enquirer wants to know the habitat of an English plant, so as to gather it," he cannot obtain "such simple information" at the Gardens. It certainly seems odd that "a gentleman in authority" should have suggested that the enquirer should go to the British Museum for botanical books, which Mr. Watts figuratively says "was like pumping at a dry well"; but we doubt whether the Kew authorities will see their way to establish "a small reference library of botanical books for the use of the general public, where one of the advanced students in turn could officiate."

We are glad to announce the completion of vol. vii. of the *Flora of Tropical Africa*, the concluding part of which, save for the addenda, is written entirely by Mr. J. G. Baker, and comprises *Dioscoreaceæ*, *Liliaceæ*, and the completion of *Amaryllidaceæ*. The addenda to various orders are presumably contributed by those to whom the orders were originally entrusted, and bring the work up to date: it is to be regretted that each is not accompanied with a reference to the page where it should be inserted. Dr. Dyer contributes a preface, from which it would seem that the regrettable delay which occurred in the continuation of the work (which had been for twenty years in abeyance) was largely due to the fact that the Welwitsch collections "were no longer available for study at Kew." This, however, is somewhat misleading, for Welwitsch's plants were by no means always included in the earlier volumes—*e.g.* of the 250 species of *Compositæ* collected by him only one is included in the *Flora*.

In this new volume, owing to the increase of botanical knowledge, Dr. Dyer has found it necessary "to more clearly define" the regions into which Prof. Oliver divided the whole area: he also gives a list of the more important (and some of the less important) collections which have reached Kew since 1868. We are sorry to note an indication that another hitch may possibly take place in the publication of the work. Dr. Dyer says that "the printing of this volume has been attended with very considerable difficulties," and adds, "whether it is followed by any other volumes will largely depend on the extent to which these difficulties are removed." But as these difficulties only attend the printing, it would appear that their existence cannot be ascertained until the work is actually in progress. Should they occur, we trust that, in the interests of science, they may be speedily overcome.

The Sun-Children's Budget is a new sixpenny "Botanical Quarterly," under the editorship of (Miss?) Phœbe Allen and Dr. Henry W. Godfrey. Miss Allen is anxious "to kindle a spirit of good fellowship between its readers and the Sun-Children —*i.e.* Flowers," and it is further intended to serve "as a vehicle for conveying botanical instruction in fancy dress." Miss Allen, we note, is already known to fame as the "Author of 'Playing at Botany.'" "Besides Papers suitable for Readers from Six to Sixteen (in which they are invited to compete for prizes), the Magazine contains Serial Articles for Adults," to be contributed by "well-known Writers," the first two of whom, Dr. Dyer and Mr. Francis George Heath, are better entitled to the qualifying adjective than some of the others mentioned.

Judging from the October number, there is some room for improvement in matters botanical. "Alba Lawsonia" is new to us, and "Euphorbia Cypressia" is not the usual Latin equivalent for the Cypress Spurge; nor are we familiar with the "yellow arsenic daisies," which appear to be common in Guernsey; the "Algæ Nostoc" is also odd. We should hardly have thought it necessary to take "spud in hand" for the purpose of collecting sundews, which Miss (?) Allen was fortunate enough to find "each bearing its crown of white flowers." The "Sun-Children," like other children, indulge in chat, as well as in very weak jokes, and "Calluna vulgaris" writes her history.

We have received the "Report and Transactions of the South Eastern Union of Scientific Societies for 1898," which contains, among other interesting papers, a presidential address by Mr. G. S. Boulger, a paper by Dr. H. F. Parsons "on the nature of the soil in relation to the distribution of plants and animals," and a suggestive article by Mr. E. M. Holmes on "Botanical work wanting workers": this last includes a list of mosses and scale-mosses which should be looked for in Kent, and should stimulate local research. The Union has a "Botanical Research Committee," from which much useful work may be expected.

Attention was called in this Journal (1895, p. 26) to the appearance of Part I. of General Paris's *Index Bryologicus* (Paris: Klincksieck, Dec. 1894), and reference was made to the widely felt want of some such work, by the help of which the existing genera and species of Mosses might readily be ascertained, and their descriptions found and synonyms traced. For our synopses were published so long ago, and the descriptions of new species created in the meantime are so numerous and so widely scattered, that it had become a task of infinite labour to gather together all the recognized constituents of a given country's moss-flora, or, indeed, to turn up the description of a given species.

In his *Index Bryologicus*, General Paris has made a courageous and industrious attempt to extricate us from our difficulties, and to supply a ready guide to the literature of all known Mosses, and a clue to lead us through the perplexing and tortuous mazes of synonymy. The arrangement is alphabetical; and in the recently issued Part V. (pp. 1285–1380; price 4 francs) the work appears to have reached its proper end in the letter Z. This, however, is not really the case. The *Index* is not complete. It contains, indeed, nearly 12,000 species; but there remain some 2000 species more to be published. This remainder is of twofold origin. In the first place, some rare or little known papers, overlooked by General Paris, were brought to his attention. In the second, some bryologists, stimulated by the *Index*, have been hastily flooding the market with their wares. In particular, the veteran Karl Müller has placed before the public a host of new species—probably upwards of a thousand; and it is unlikely that the sound of chipping will yet cease in his workshop. Well, General Paris holds an evergrowing reserve of 2000 species; and it was naturally expected that these would appear as a supplement to the present part. But, alas! Part V. contains no Supplement; and, indeed, if a current rumour may be believed, the Linnean Society of Bordeaux, under whose auspices the work has been published, finding the cost of publication to be in excess of the original estimate, have declined to carry the venture further. If this be the case, it will cause very grievous and widespread dissatisfaction, and will seriously impair the value of the *Index*. It is essential that the *Index*, if it is to acquire the full confidence of bryologists, should be made as complete a record of moss-references as possible. A Supplement is indispensable; and if the society is debarred by lack of funds at present from completing the undertaking, if also there is no rich member of the society who is willing to devote some of his superfluous wealth to the rescue of the society from an awkward position, and, again, if no provision is made by the French Government for aiding the publication of meritorious scientific works, cannot the society be induced to make a special effort to complete General Paris's *Index* during the year of the great International Exposition, thereby conferring upon the botanists of the world an act of courtesy which will be most thankfully received?—A. G.

We regret to record the death of Dr. James Edward Tierney Aitchison, which took place at Kew on Sept. 30th. He was born in India on 28th October, 1836, graduated at Edinburgh, and entered the Bengal Medical Service in 1858. He soon became interested in the Indian flora, and his collections provided material for numerous important papers in the Journal of the Linnean Society, of which body he became a Fellow in 1863. His most important collections were those made in the Kuram Valley in 1878–80, and those made in connection with the Afghan Delimitation Committee in 1884. Dr. Aitchison was elected F.R.S. in 1883: he is commemorated by Mr. Hemsley—who collaborated with him in much of his work, and who contributes an obituary notice to *Nature* of Oct. 13th—in the Rubiaceous genus *Aitchisonia*.

Messrs. Duckworth announce for publication ‘A Glossary of Botanic Terms,’ by Mr. B. Daydon Jackson, and ‘A Text-book of Agricultural Botany, by Mr. John Percival.

We have received, too late for notice in the present number, the new edition of the *Cybele Hibernica*, issued under the editorship of Messrs. R. W. Scully and N. Colgan. It seems to be admirably done.

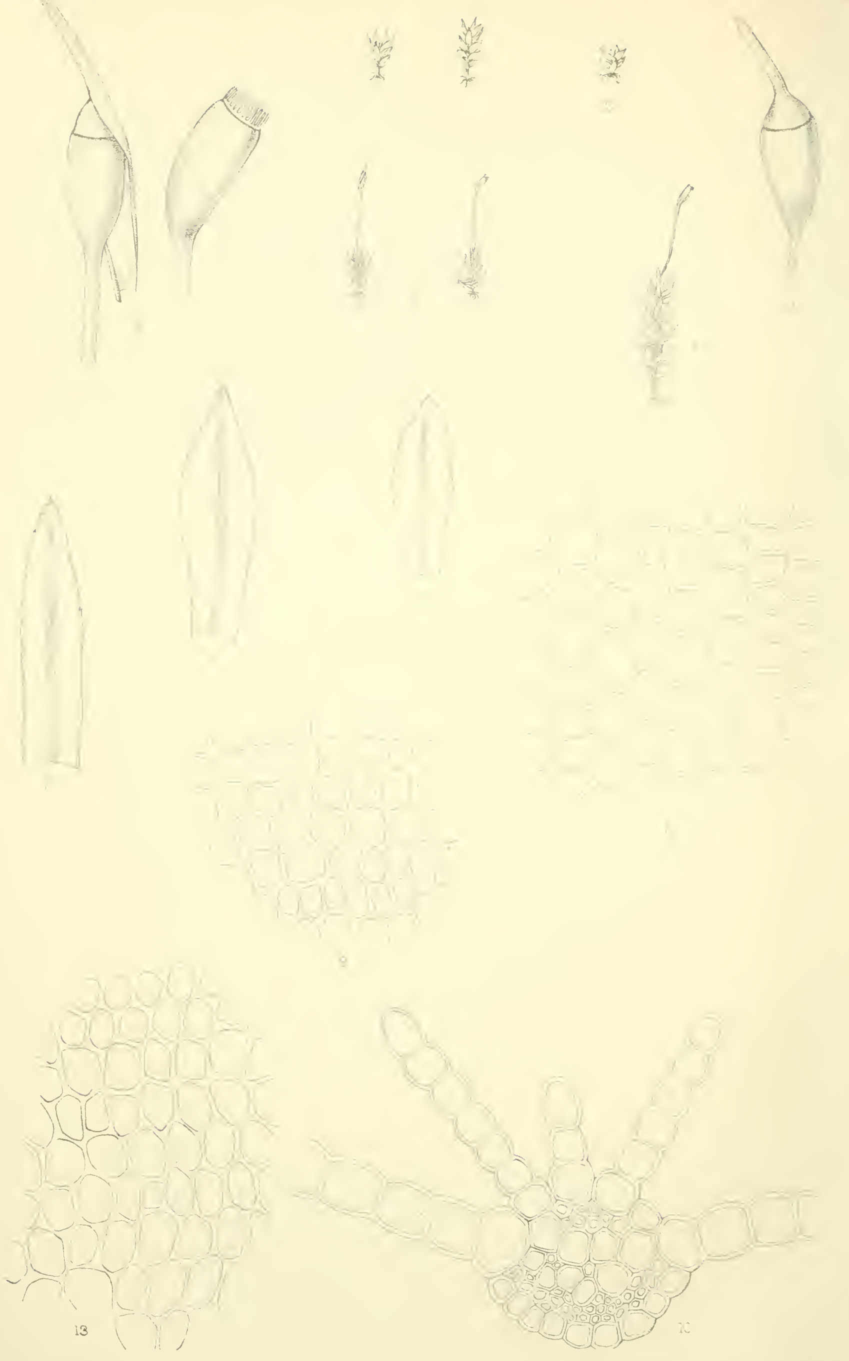
Dr. Otto Kuntze has issued another volume of his *Revisio Genera Plantarum*, which contains much interesting and important material. Dr. Kuntze's labours, as it seems to us, meet with somewhat insufficient appreciation among English botanists, we hope to publish next month a review by Mr. Hiern of this instalment. Oddly enough, the book seems to have attracted the attention of the *Daily Chronicle*, which entirely misapprehends Dr. Kuntze—whom it calls "Kurtze"—and finds in his work only "a curious display of spiteful jocularity." Dr. Kuntze, however, is not responsible for "Mr. Ascherson, of England," of whom the *Chronicle* speaks. Of the five Latinised names cited by the *Chronicle*, four are given inaccurately!

Newspapers, one cannot help thinking, would do well to leave botany alone, or to take a botanist into their counsel. The *Daily Telegraph* of Oct. 12th, in the course of an article in the very best telegraphese on "The Rainbow Wonders of Windermere," has the following gem:—"It was rainbows, rainbows, all the way! and what was the cause of this October glory of rainbow flood? It was nothing in the world but a smooth lake surface, and the fine dust of the pollen of a humble water-plant—some say the pollen of the American water-weed *Vallisneria*, others aver it is the gold dust of the water-lobelia, which, floating upward through the tranquil water on a calm October day, lies on the surface of the polished lake-mirror with power to change the face of the water into such a refracting and diffracting medium as to splinter all the sun into irridescence (*sic*), and unravel the beam of white light into the colours of the prism. It would seem that the water must be of certain temperature to encourage the plant to send forth its prism-makers to the surface." We commend this phenomenon to the notice of Mr. Grant Allen, but we can assure the *Daily Telegraph* that those who say it is due to "the American water-weed *Vallisneria*" are hopelessly out of it, if only for the reason that no such plant grows in the lake, or indeed in England out of cultivation.

Mr. C. A. Barber has been appointed to the Directorship of the Government Gardens at Madras.

It may be well to note that the earlier opening of Kew Gardens, which came into force for the summer months, has been suspended, and that the Gardens are now closed until noon.

The first meeting of the Linnean Society for the forthcoming session will be held on the 3rd of November, when a paper will be read by Prof. H. Marshall Ward on *Craterostigma pumilum* Hochst., and Messrs. H. and J. Groves will exhibit *Nitella hyalina* Ag., of which an account appears in our present issue.



F. S. Salmon del.
P. Morgan lith.

West, Newman imp.

Catharinea tenella, *Röhl.*

CATHARINEA TENELLA Röhl. IN BRITAIN.

By Ernest S. Salmon.

(Plate 393.)

In May last Sir James Stirling showed me the locality in Bedgbury Wood, near Goudhurst, Kent, for *Catharinea angustata* Brid., lately discovered there by Mr. W. E. Nicholson. Amongst the *C. angustata* we found another species of *Catharinea*, which, as noted in this Journal for August last, proved to be *C. tenella* Röhl., a new moss for Britain. Last October, Sir James Stirling, Mr. W. E. Nicholson, and myself visited the locality, and found a few fruiting plants. I have compared these with authentic continental specimens of *C. tenella*, and find that the British plants agree well with them in all characters.

I propose to give a description of *C. tenella*, so as to direct the attention of British bryologists to this plant, which may certainly be expected to occur in other localities.

The most detailed description is that of Limpricht in Rabenhorst's *Cryptogamen-Flora*, Band iv. Abth. ii. p. 598. As this work may not be generally accessible, I will quote the synonymy and diagnosis (in translation) given there :—

" C. tenella Röhl. in Ann. Wett. iii. 234 (1814). *Mnium orthorrhynchum* Brid. Spec. Musc. iii. 45 (1817). *Polytrichum undulatum β minus* Funck, Moost. 70 (1820). *Bryum Polla orthoryncha* Brid. Bryol. univ. ii. [i.] 691 (1827) [1826]. *Atrichum tenellum* Bryol. Eur. fasc. 21, 22, Monogr. p. 9, t. 4 (1844).

" Dioicous. Tufts lax, ½ to 2, rarely 3 cm. high, dirty yellowish green. Stem slender, simple, yellowish green, densely leaved, in transverse section angular, central strand ill-defined, *not* polytrichoid, all the cells thin-walled. Lower leaves small and squamiform, above quickly becoming larger, soft, erecto-patent, when dry curled and crisped at the margins, oblong to elongate-lanceolate, 3–4½ mm. long, and 1 mm. broad, keeled, scarcely undulate; lamina *smooth at back*, or in the upper leaves with a few distant spines, bordered with a narrow bistratose margin, spinose with single or double teeth *from the apex to below the middle*. Nerve with 2–4 lamellæ, spinose at back towards the apex, biconvex, two rows of Deuter cells, one row of central cells, the upper stereïd band rudimentary. Leaf cells rounded-hexagonal, 0·018–0·024 mm., basal rectangular (1 : 2 to 4). Seta ½ to 2 cm. high, slender, *yellowish*, becoming flesh-coloured, above slightly turned to the right, with a cylindrical cavity in the foot; vaginula with a delicate laciniate ochrea. Capsula slightly inclined, about 2 mm. long, ¾ mm. thick, *obovoid* to oblong and urn-shaped, dirty yellowish brown. *Calyptra almost smooth*, often remaining behind on the seta. Lid as long as the capsule, rostrate from a hemispherical shining dark reddish brown base. Cells of the *exothecium for the most part quadrate*, with strongly thickened longitudinal walls. Peristome teeth large (0·35 mm.), minutely papillose, basal membrane (0·03 mm.) and axils of the teeth yellowish. Spores 0·014 to 0·021 mm., yellowish, almost smooth. Fruit, August and September."

C. tenella occurs in Scandinavia, Germany, Belgium, Austro-Hungary, Switzerland, and France, and so might have been expected to occur in Britain. It has, in fact, been already recorded as British from three localities: Strensall Moor, Yorkshire, Loch Goil Head, and between Ben Lawers and Killin; but all the specimens from these places are, according to Dr. Braithwaite, only forms of *C. undulata* (L.) Web. Mohr., or *C. undulata* var. *minor* (Hedw.) Web. Mohr. (see Braithw. Brit. Moss Flora, i. 41).

The distinguishing characters of *C. tenella* are the dioicous inflorescence, in which it is essentially distinct from *C. undulata*, from the ordinary form of which it differs in the oblong-lanceolate (not longly lingulate) leaves, not or only slightly undulate, and nearly smooth at back, the few often interrupted lamellæ, and the short oblong slightly inclined but not arcuate capsule. *C. angustata* differs conspicuously in the numerous lamellæ, smaller leaf-cells, &c. *C. crispa* has taller stems, and distant broader leaves, with laxer areolation.

It may be mentioned here that the character emphasized by Limpricht (*loc. cit.* 593) as separating *C. crispa* from *C. tenella* and *C. angustata* does not always hold good. *C. crispa* is stated to have the *nerve* smooth at back, the other species to have it spinose towards the apex. In the specimens, however, of *C. crispa* that I have examined—Mr. Dixon tells me that the same is also his experience—the nerve frequently bears towards the apex, at back, a few distant spines, just as is the case in *C. tenella* and *C. angustata*.

Although the ordinary form of *C. undulata* is very different from *C. tenella*, the var. *minor* approaches the latter species so closely at times that the difference in inflorescence seems to be the only character separating them. As a rule, however, *C. tenella* has more oblong leaves, fewer lamellæ, and lamina smoother at back; while the var. *minor* generally shows here and there signs of the leaves becoming elongate and more undulate, and capsule arcuate, &c. I have, however, seen leaves on some specimens of the var. *minor* (*e.g.* the specimen of McKinlay's Ben Lawers plant in the Kew Herbarium) which are identical in shape, areolation, the very few low lamellæ, and absence of spines at the back of the lamina with those of *C. tenella*, and the capsule very similarly shaped. *C. undulata* var. *minor* certainly wants further study, and observations on growing plants with reference to the inflorescence would be extremely valuable.

The first specimens (fig. 1) collected of the Bedgbury Wood *C. tenella* attracted attention by the short stems, terminating in a female flower (without any appearance of having proliferated from a male inflorescence), the wider scarcely undulated leaves, and the very few and inconspicuous interrupted lamellæ. A certain character sometimes occurs in the growth of the stems of *C. tenella* which may easily give rise to a misconception. In some specimens the stems of the fertile plants have a comal-like tuft of leaves about half-way down (see fig. 11 ×); these, however (unlike *C. undulata*), are not the old leaves of the *male* inflorescence from which the female stem has proliferated, but are the leaves of an old *female* flower, and in the axils of these leaves withered archegonia can be found. In such cases, apparently, the first-formed archegonia have not been fertilized, and the axis of the stem has grown on. and produced another female flower in the following season.

C. tenella has a laxer areolation than the ordinary form of *C. undulata*. This is especially the case in the lower ovate-oblong leaves, which with the few low lamellæ much recall those of *C. crispa*. *C. undulata* var. *minor*, however, as mentioned above, sometimes presents the same characters; and in *C. tenella* itself the areolation of the uppermost leaves becomes smaller.

C. tenella was found sparingly, in company with *C. undulata* and *C. angustata*, by a sandy roadside and in "drives"; in the former place with *Radiola linoides*. On the Continent it prefers damp clayey or loamy places, but sometimes occurs on damp sand. In the Kew Herbarium there are specimens collected by Bruch near Berlin "on damp sand, with *Radiola linoides*," which are quite similar in habit, &c., to the British plants.

I have placed a specimen of the Goudhurst *C. tenella* in the Kew Herbarium for reference.

Explanation of Plate 393.—Figs. 1–10. *C. tenella* Röhl. from Bedgbury Wood, near Goudhurst, Kent. 1. Female plant, nat. size. 2. Male plant, nat. size. 3. Two fruiting plants, nat. size. 4. Capsules × 12. 5. Upper leaf of fruiting plant × 12. 6. Leaf from middle of stem × 12. 7. Leaf from a barren plant × 12. 8. Areolation of leaf (fig. 6) at one-third from the apex × 255. 9. Ditto (fig. 5), ditto × 255. 10. Transverse section of leaf × 255. 11–13. *C. tenella*, from a specimen in the Kew Herbarium (Helsingfors, coll. S. O. Lindberg). 11. Fruiting plant, showing proliferation at ×, nat. size. 12. Capsule × 12. 13. Areolation at one-third from apex of leaf, × 255.

THE FLOWERING PLANTS OF NOVAYA ZEMLYA, ETC.

By Colonel H. W. Feilden.

(Concluded from p. 436.)

	N. Lat.							
	76–77°	75–76°	74–75°	73–74°	72–73°	71–72°	70–71°	69–70°
Fam. Ranunculaceæ.								
Ranunculus Pallasii Schl.	—	—	—	+	+	+	+	+
R. lapponicus L.	—	—	—	+	+	+	+	—
R. hyperboreus Rottb.	—	—	—	+	+	+	+	+
R. pygmæus Wahlenb.	—	—	+	+	+	+	+	+
R. nivalis L.	—	+	+	+	+	+	+	+
R. sulphureus Sol.	—	—	+	+	+	+	+	+
R. acris L. f. *borealis* Trautv.	—	—	—	+	+	+	+	+
R. auricomus L.	—	—	—	+	+	—	+	+
Caltha palustris L.	—	+	+	+	+	+	+	+
Thalictrum alpinum L.	—	—	—	+	+	+	+	+
Fam. Papaveraceæ.								
Papaver nudicaule L.	+	+	+	+	+	+	+	+
Fam. Cruciferæ.								
Matthiola nudicaulis Trautv.	—	—	+	+	+	+	+	+
Cardamine pratensis L.	—	—	+	+	+	+	+	+
C. bellidifolia L.	—	—	+	+	+	+	+	+
Arabis alpina L.	—	—	—	+	+	+	+	+
A. petræa Lam.	—	—	—	+	+	+	+	+
Eutrema Edwardsii R. Br.	—	—	—	+	+	+	+	+
Braya alpina Koch	—	+	—	+	+	+	+	+
Cheiranthus pygmæus Adams	—	—	—	+	—	—	—	—
Cochlearia fenestrata R. Br.	—	+	+	+	+	+	+	+
Schivereckia podolica Andrz.	—	—	—	—	—	+	—	—
Draba alpina L.	+	+	+	+	+	+	+	+
D. repens Bieb.	—	—	—	—	—	—	+	+
D. arctica J. Vahl	—	—	—	+	—	+	—	—
D. hirta L.	—	—	—	+	+	+	+	+
D. fladnizensis Wulf.	—	—	+	+	+	+	+	+
D. muricella Wahlenb.	—	—	—	—	—	—	+	—
Fam. Violaceæ.								
Viola biflora L.	—	—	—	—	—	—	+	+
Fam. Caryophyllaceæ.								
Silene acaulis L.	—	—	+	+	+	+	+	+
Wahlenbergia apetala Fr.	—	—	+	+	+	+	+	+
W. affinis Vahl	—	—	+	—	—	+	+	+

	N. Lat.							
	76–77°	75–76°	74–75°	73–74°	72–73°	71–72°	70–71°	69–70°
Stellaria longipes Goldie	—	—	+	+	+	+	+	+
S. humifusa Rottb.	—	—	—	+	+	+	+	+
S. crassifolia Ehrh.	—	—	—	—	—	—	—	+
Cerastium alpinum L.	—	+	+	+	+	+	+	+
C. trigynum Vill.	—	—	—	+	—	—	—	—
Alsine biflora L.	—	—	—	+	—	+	+	+
A. imbricata C. A. M.	—	—	—	+	—	—	—	—
A. rubella Wahlenb.	—	—	—	+	+	+	+	+
Arenaria ciliata L.	—	—	—	—	+	+	+	+
A. peploides L.	—	—	—	—	—	+	+	+
Sagina nivalis Fries	—	—	—	+	+	+	—	—
S. saxatilis Wimm.	—	—	—	—	—	—	—	+
Fam. PAPILIONACEÆ.								
Hedysarum obscurum L.	—	—	—	+	+	+	+	+
Astragalus alpinus L.	—	—	+	+	+	+	+	+
A. frigidus A. Gray	—	—	—	+	+	+	+	+
Oxytropis campestris DC.	—	+	+	+	+	+	+	+
Fam. ROSACEÆ.								
Rubus Chamæmorus L.	—	—	—	+	+	+	+	+
Comarum palustre L.	—	—	—	—	+	—	+	+
Potentilla pulchella R. Br.	—	—	—	+	—	+	—	+
P. fragiformis Willd.	—	—	+	+	+	+	+	+
P. nivea L.	—	—	—	+	—	—	—	—
P. maculata Pourr.	—	—	—	—	—	+	+	+
Dryas octopetala L.	—	+	+	+	+	+	+	+
Fam. HALORAGEÆ.								
Hippuris vulgaris L.	—	—	—	—	+	—	+	+
Fam. SAXIFRAGACEÆ.								
Saxifraga oppositifolia L.	+	+	+	+	+	+	+	+
S. flagellaris Willd.	—	+	+	+	+	+	+	—
S. aizoides L.	—	—	—	+	+	+	+	+
S. Hirculus L.	—	—	+	+	+	+	+	+
S. stellaris L. f. *comosa* Poir.	—	—	+	+	+	+	+	+
S. nivalis L.	—	+	+	+	+	+	+	+
S. hieraciifolia Waldst. & Kit.	—	—	+	+	+	+	+	+
S. cernua L.	—	+	+	+	+	+	+	+
S. rivularis L.	—	—	+	+	+	+	+	+
S. cæspitosa L. f. *decipiens* Ehrh.	—	+	+	+	+	+	+	+
Chrysosplenium alternifolium L.	—	—	—	+	+	+	+	+

	N. Lat.							
	76–77°	75–76°	74–75°	73–74°	72–73°	71–72°	70–71°	69–70°
Fam. PARNASSIACEÆ.								
Parnassia palustris L.	—	—	—	—	—	—	—	+
Fam. CRASSULACEÆ.								
Sedum Rhodiola DC.	—	—	—	+	+	+	+	+
Fam. UMBELLIFERÆ.								
Pachypleurum alpinum Ledeb.	—	—	—	—	+	+	+	+
Fam. ONAGRACEÆ.								
Epilobium latifolium L.	—	—	—	+	+	+	—	—
E. alpinum L.	—	—	—	+	—	—	+	+
E. palustre L.	—	—	—	—	—	—	+	+
Fam. VALERIANACEÆ.								
Valeriana capitata Pall.	—	—	—	+	+	+	+	+
Fam. COMPOSITÆ.								
Pyrethrum bipinnatum Willd. [Rupr.	—	—	—	—	—	—	+	+
Matricaria inodora L. v. *phæocephala*				+	+	+	+	+
Artemisia borealis Pall....	—	—	—	+	+	+	+	+
A. vulgaris L. v. *Tilesii* Ledeb.	—	—	—	+	+	+	+	+
Arnica alpina Olin.	—	—	—	+	+	+	—	—
Senecio palustris L. f. *congesta* Hook.	—	—	—	—	+	—	—	—
S. campestris DC. v. *integrifolius* Hook.	—	—	—	—	—	—	+	+
S. frigidus Less.	—	—	—	—	—	—	+	+
S. resedifolius Less.	—	—	—	—	—	+	+	+
Antennaria carpathica R. Br.	—	—	—	+	+	+	+	+
Erigeron uniflorus L.	—	—	—	+	+	+	+	+
Petasites frigida Fr.	—	—	—	+	+	+	+	+
Taraxacum officinale Web.	—	+	—	+	+	+	+	+
T. phymatocarpum J. Vahl	—	—	—	+	+	+	+	+
Fam. CAMPANULACEÆ.								
Campanula rotundifolia L.	—	—	—	—	+	+	—	—
C. uniflora L.	—	—	—	+	+	+	+	+
Fam. PYROLACEÆ.								
Pyrola grandiflora Raddi	—	—	—	+	+	+?	+?	+?
Fam. VACCINIACEÆ.								
Arctostaphylos alpina L.	—	—	—	—	+	—	+	—
Vaccinium Vitis-idæa L. f. *pumila* Horn.	—	—	—	+	+	—	+	+
V. uliginosum L.	—	—	—	+	+	—	+	+

	N. Lat.							
	76–77°	75–76°	74–75°	73–74°	72–73°	71–72°	70–71°	69–70°
Fam. PRIMULACEÆ.								
Primula stricta Horn.	—	—	—	—	+	+	—	+
P. farinosa L.	—	—	—	—	—	+	+	+
Androsace septentrionalis L.	—	—	—	—	—	+	—	—
A. Chamæjasme Koch	—	—	—	—	—	—	+	+
A. triflora Adams	—	—	—	—	+	+	—	—
Cortusa Matthioli L.	—	—	—	—	—	—	+	+
Trientalis europæa L. ?	—	—	—	—	—	—	—	—
Fam. PLUMBAGINACEÆ.								
Armeria sibirica Turcz.	—	—	—	+	—	—	+	+
Fam. POLEMONIACEÆ.								
Polemonium cæruleum L. f. *acutifolia* Willd.	—	—	—	+	+	+	+	+
P. pulchellum Bunge	—	—	+	+	+	+	—	+
Fam. ASPERIFOLIÆ.								
Myosotis alpestris Koch	—	—	+	+	+	+	+	+
Eritrichium villosum Bunge	—	—	+	+	+	+	+	+
Fam. GENTIANACEÆ.								
Gentiana chrysoneura Ekstam & Murb.	—	—	—	—	+	—	—	—
G. tenella Fr.	—	—	—	—	+	—	—	—
Fam. PERSONATÆ.								
Pedicularis sudetica Willd.	—	—	—	+	+	+	+	+
P. lanata Willd. f. *dasyantha* Trautv.	—	—	—	+	+	+	+	+
P. hirsuta L.	—	—	+	+	+	+	+	+
P. Oederi Vahl	—	—	—	+	+	—	+	+
P. lapponica L.	—	—	—	+	—	—	+	+
Fam. SELAGINACEÆ.								
Lagotis glauca Gärtn. f. *Stelleri* (Cham. & Schl.	—	—	+	—	—	—	—	—
Fam. PLANTAGINACEÆ.								
Plantago maritima L. f. *pumila* Kjellm.	—	—	—	—	—	—	—	+
Fam. POLYGONACEÆ.								
Polygonum Bistorta L.	—	—	—	—	—	—	+	+
P. viviparum L.	—	—	+	+	+	+	+	+
Rumex arcticus Trautv.	—	—	—	—	—	—	+	+

	N. Lat.							
	76–77°	75–76°	74–75°	73–74°	72–73°	71–72°	70–71°	69–70°
R. domesticus Hartm. f. *nana* Hook	—	—	—	—	+	—	—	—
R. Acetosa L.	—	—	—	+	+	+	—	+
Oxyria digyna Hill.	+	+	+	+	+	+	+	+
Koenigia islandica L.	—	—	—	+	+	—	—	—
Fam. Empetraceæ.								
Empetrum nigrum L.	—	—	—	—	—	—	+	—
Fam. Betulaceæ.								
Betula nana L.	—	—	—	+	+	+	+	+
Fam. Salicineæ.								
Salix polaris Wahlenb.	—	—	+	+	+	+	+	+
S. herbacea L.	—	—	—	—	—	—	—	+
S. rotundifolia Trautv.	—	—	—	+	+	+	+	+
S. reticulata L.	—	—	—	+	+	+	+	+
S. arctica Pall. et var. *Brownei* And.	—	—	+	+	+	+	+	+
S. glauca L. et f. *subarctica* Lundstr.	—	—	+	+	+	+	+	+
S. reptans Rupr.	—	—	—	+	+	+	—	+
S. ovalifolia Trautv.	—	—	—	—	—	+	+	—
S. tajmyrensis Trautv.	—	—	—	+	+	+	—	—
S. lanata L.	—	—	—	+	+	+	+	+
S. myrsinites L.	—	—	—	—	—	+	+	+
Fam. Liliaceæ.								
Allium sibiricum L.	—	—	—	—	—	—	—	+
Lloydia serotina Reichb.	—	—	—	—	—	—	+	+
Veratrum album L.	—	—	—	—	—	—	—	+
Fam. Juncaceæ.								
Juncus castaneus Sm.	—	—	—	—	—	+	—	+
J. biglumis L.	—	—	+	+	+	+	+	+
Luzula Wahlenbergii Rupr.	—	—	—	+	+	+	+	+
L. confusa Lindeb.	—	—	+	+	+	+	+	+
L. arctica Blytt	—	—	—	+	+	+	+	+
L. spicata DC.	—	—	—	+	—	—	—	—
Fam. Cyperaceæ.								
Eriophorum angustifolium Roth.	—	—	—	+	+	+	+	+
E. vaginatum L.	—	—	—	+	+	+	+	+
E. Callithrix Cham.	—	—	—	+	—	—	—	+
E. russeolum Fr.	—	—	—	—	—	—	—	+
E. Scheuchzeri Hoppe	—	—	—	+	+	+	+	+

	N. Lat.							
	76–77°	75–76°	74–75°	73–74°	72–73°	71–72°	70–71°	69–70°
Carex pulla Good.	—	—	—	+	+	+	+	+
C. rotundata Wahlenb.	—	—	—	—	—	—	—	+
C. fuliginosa Schk. = *C. misandra* R. Br.	—	—	—	+	+	+	+	+
C. rariflora Sm.	—	—	—	—	+	+	+	+
C. salina Wahlenb.	—	—	—	+	—	+	+	+
C. aquatilis Wahlenb.	—	—	—	+	+	+	+	+
C. acuta L.	—	—	—	—	—	+	—	—
C. rigida Good.	—	—	—	+	+	+	+	+
C. hyperborea Drej.	—	—	—	—	—	—	+	—
C. lagopina Wahlenb.	—	—	—	—	—	—	+	+
C. glareosa Wahlenb.	—	—	—	+	—	+	+	+
C. Ursina Desv.	—	—	—	—	+	+	+	+
C. incurva Lightf.	—	—	—	—	—	—	+	+
C. dioica L. f. *parallela* Laest.	—	—	—	—	—	—	+	+
C. rupestris All.	—	—	—	+	+	+	+	—
Fam. GRAMINEÆ.								
Elymus arenarius L.	—	—	—	—	—	—	—	+
Festuca rubra L. f. *arenaria* Osb. ...	—	—	+	+	+	+	+	+
F. ovina L. et f. *brevifolia* R. Br. ...	—	—	+	+	+	+	+	+
Poa pratensis L.	—	—	+	+	+	+	+	+
P. alpina L.	—	—	—	+	+	+	+	+
P. arctica R. Br. et f. *stricta* Lindeb.	—	—	—	+	+	+	+	+
P. abbreviata R. Br.	—	—	—	+	—	—	—	—
Arctophila fulva Nym.	—	—	—	+	+	—	+	+
Glyceria Kjellmanni J. Lge.	—	—	—	+	—	—	—	—
G. Vahliana (Liebm.) Fr.	—	—	—	+	+	—	—	—
G. vilfoidea (Ands.) Th. Fr.	—	—	—	—	—	+	+	—
G. tenella J. Lge.	—	—	—	—	—	+	+	+
G. vaginata J. Lge.	—	—	—	—	—	—	—	+
Pleuropogon Sabinii R. Br.	—	—	+	+	+	+	—	+
Phippsia algida R. Br. et *concinna* Fr.	—	—	+	+	+	+	+	+
Colpodium latifolium R. Br.	—	—	—	+	+	+	—	+
C. humile Lge.	—	—	—	—	—	—	+	—
Dupontia Fisheri R. Br.	—	—	—	+	+	+	+	+
Trisetum subspicatum L.	—	—	—	+	+	+	+	+
Aira cæspitosa Beauv.	—	—	+	+	+	+	+	+
A. alpina L.	—	—	—	+	+	—	—	+
Alopecurus alpinus Sm.	—	—	+	+	+	—	+	+
A. pratensis L. f. *alpestris* Wahlenb....	—	—	—	+	—	+	—	+
A. ruthenicus Weinm.	—	—	—	—	+	—	—	—
Phleum pratense L.	—	—	—	—	+	—	—	—
Hierochloe alpina R. & S.	—	—	+	+	+	+	+	+
H. pauciflora R. Br.	—	—	—	—	+	+	+	+
Calamagrostis neglecta Gaertn. = *C. stricta* P. B. = *C. Holmii* Lge.	—	—	—	+	+	—	—	+

	N. Lat.							
	76–77°	75–76°	74–75°	73–74°	72–73°	71–72°	70–71°	69–70°
C. strigosa Boug.	—	—	—	—	+	—	—	—
Koeleria cristata Gaud.	—	—	—	—	—	—	+	+
Cryptogamæ Vasculares.								
Equisetaceæ.								
Equisetum arvense L.	—	—	—	+	+	+	+	+
E. scirpoides Mich.	—	—	—	+	+	—	—	—
Filices.								
Cystopteris fragilis Bernh.	—	—	—	+	+	+	+	+
Lycopodiaceæ.								
Lycopodium Selago L.	—	—	—	+	+	—	+	+
Summary...	4	16	49	134	135	132	145	158

In the above table, 195 phanerogams and four vascular cryptogams are admitted as the known flora of Waigats, Novaya Zemlya, and Lutke and Barents Lands. In the excellent paper by Herr O. Ekstam* on the flora of Novaya Zemlya, he includes in his list 200 plants, but I have deemed it expedient to deduct from that enumeration the following, viz.:—*Ranunculus affinis*, for the reasons advanced in the text; *Pyrola minor*, its presence not having been satisfactorily established; *Draba oblongata*, *D. altaica*, *D. lactea*, and *D. corymbosa* as synonyms (O. Gelert,† "Notes on Arctic Plants"); *Salix Brownei*, which is here included as a variety of *S. arctica; Catabrosa concinna* as = *Phippsia algida;* and *Calamagrostis Holmii*, included under the head of *C. neglecta*. On the other hand, eight names are added to this list:—

Ranunculus auricomus.
Alsine imbricata.
Potentilla nivea.
Gentiana tenella.
Empetrum nigrum.
Veratrum album.
Poa abbreviata.
Koeleria cristata.

Bringing up the number of plants enumerated in the accompanying table to 199.

It is to be observed that the zones of 76–77° and 75–76° are in a botanical sense uninvestigated.

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* *Botanische Jahrbücher*, xxii. 185, Leipzig, 1896.

† *Særtryk af Botanisk Tidsskrift*, Kjöbenhavn, 1898.

REVISION OF EXTRA-TROPICAL SOUTH-AFRICAN ASCLEPIADACEÆ.

By Rudolf Schlechter.

(Concluded from Journ. Bot. 1897, p. 295.)

It is with some hesitation that I publish this list of *Stapelieæ*. However, it had to be done. But I hope that, incomplete as it may be, it will at any rate throw some light upon several species. Besides, having begun to pay more attention to this group than I had formerly occasion to do, I hope to find leisure to study them more carefully, and in a future time to give a more full account of them.

Unfortunately, my views of species seem to differ widely from those of Mr. N. E. Brown, of Kew; but although I believe him a most careful worker, I fear that many of his species, when he has seen more material, will have to be united with older ones.

XXXIX. Hoodia Sweet, Hort. Brit. ed. 2, 359 (1830); Dcne. in DC. Prodr. viii. 664 (1844); Benth. & Hk. f. Gen. Pl. ii. 783 (1876). *Monothylacium* G. Don, Gen. Syst. iv. 116 (1837). *Scytanthus* Hk. Ic. Pl. t. 605 (1844).

1. H. Gordoni Sweet, *l. c.* 359 (1830); Dcne. *l. c.* viii. 665 (1841). *Scytanthus Gordoni* Hk. Ic. Pl. t. 625. *Stapelia Gordoni* Mass. Stap. 24, t. 40 (1796); Don, Syst. iv. 116 (1837). *Monothylacium Gordoni* Don, *l. c.* 116 (1837).
Little Namaqualand, Clanwilliam, Calvinia, Van Rhynsdorp.

2. H. Barklyi Dyer in Journ. Linn. Soc. Bot. xv. 252, t. 5, f. 3 (1876).
Karroo.

3. H. Bainii Dyer in Bot. Mag. t. 6348 (1878).
Karroo, Gamka River.

XL. Trichocaulon N. E. Br. in Journ. Linn. Soc. Bot. xvii. 164 (1878).

1. T. piliferum N. E. Br. *l. c.* *Stapelia pilifera* L. f. Suppl. 171 (1781).
Calvinia, Little Namaqualand.

2. T. flavum N. E. Br. *l. c.* 165.
Karroo.

3. T. cactiforme N. E. Br. in Ic. Pl. sub t. 1905 (1890). *Stapelia clavata* Willd. Spec. Pl. i. 1275 (1797). *S. cactiformis* Hook. Bot. Mag. t. 4127 (1844).
Little Namaqualand.

4. T. officinale N. E. Br. in Kew Bull. 1895, 264.
Bechuanaland.

XLI. DECABELONE Dcne. in Ann. Sc. Nat. Ser. 5, xiii. 407, t. 2 (1870–71); Bth. & Hk. f. Gen. Pl. ii. 784 (1876).

1. D. BARKLYI Dyer in Bot. Mag. t. 6203 (1875); Journ. Linn. Soc. Bot. xv. 249, t. 5, f. 4 (1876).
Karroo, Little Namaqualand, Calvinia.

XLII. HUERNIOPSIS N. E. Br. in Journ. Linn. Soc. Bot. xvii. 171 (1878).

1. H. DECIPIENS N. E. Br. *l. c.*
South Africa.

XLIII. DUVALIA Haw. Syn. Pl. Succ. 44 (1812); Benth. & Hk. f. Gen. Pl. ii. 784 (1876).

1. D. RECLINATA Haw. *l. c.* 44 (1812); Don, Syst. iv. 121. *Stapelia reclinata* Mass. Stap. 19, t. 28 (1796); Willd. Spec. i. 1282; Schultz in Roem. & Schult. Syst. vi. 48 (1820); Jacq. Stap. t. 14; Dcne. in DC. Prodr. viii. 662 (1844).
Uitenhage, Albany, Queenstown, Somerset East.

2. D. ELEGANS Haw. *l. c.*; Don, *l. c.* iv. 121. *Stapelia elegans* Mass. *l. c.* 19, t. 27 (1796); Willd. *l. c.* i. 1282; Schultes *l. c.* vi. 44; Bot. Mag. 1184 (1809); Dcne. *l. c.* viii. 662.
Little Namaqualand.

3. D. CÆSPITOSA Haw. *l. c.* 45; Don, *l. c.* iv. 121. *Stapelia cæspitosa* Mass. *l. c.* 20, t. 29 (1796); Willd. *l. c.* i. 1282; Schultes, *l. c.* vi. 44; Redouté, Pl. Grasses, t. 148; Dcne. *l.* c. viii. 662.

4. D. RADIATA Haw. *l. c.* 45 (1812); Don, *l. c.* iv. 122; Lodd. Bot. Cab. 831. *D. tuberculata* Haw. *l. c.* 46 (1812); Suppl. 13 (1819). *Stapelia radiata* Jacq. Stap. t. 12 (1806); Bot. Mag. t. 619; Dcne. *l. c.* 663. *S. tuberculata* Hort. ex Haw. *l. c.* 46.
South Africa.

5. D. GLOMERATA Haw. *l. c.* 46 (1812); Suppl. 14 (1819). *Stapelia glomerata* Hort. ex Harv. *l. c.* 46 (1812).
South Africa.

6. D. LÆVIGATA Haw. *l. c.* 46 (1812); Suppl. 14 (1819). *Stapelia lævigata* Hort. ex Haw. *l. c.* 46 (1812).
South Africa.

7. D. COMPACTA Don, *l. c.* iv. 122. *Stapelia compacta* Harv. *l. c.* 46; Schultes, Syst. vi. 46.
South Africa.

8. D. HIRTELLA Sweet, Hort. Brit. ed. 1, 276 (1830). *Stapelia hirtella* Jacq. *l. c.* t. 10; Willd. Enum. 285; Schultes, *l. c.* vi. 26; Dcne. *l. c.* 662. *S. cymosa* Hort. ex Schult. *l. c.* vi. 49. *S. reclinata* Sims, Bot. Mag. t. 1397 (1811).
South Africa.

9. D. JACQUINIANA Sweet, *l. c.* 276; Schultes, *l. c.* vi. 45; Dcne. *l. c.* 662. *Stapelia radiata* Jacq. *l. c.* t. 12; Bot. Mag. 619. *S. Jacquiniana* Schultes, *l. c.* vi. 45.
South Africa.

10. D. MASTODES Sweet, *l.c.* 276 (1830); Don, Syst. Gen. iv. 122 (1838). *Stapelia mastodes* Jacq. *l. c.* t. 13. *S. mastodis* St. Lag. in Ann. Soc. Bot. Lyon. vii. (1880).
South Africa.

11. D. REPLICATA Sweet, *l.c.* 276 (1830); Don, *l. c.* iv. 122. *Stapelia replicata* Jacq. *l. c.* t. 19; Willd. Enum. 286; Roem. & Schult. *l. c.* vi. 45; Dcne. *l. c.* viii. 662 (1844).

12. D. POLITA N. E. Br. in Gard. Chron. 1876, ii. 130; Bot. Mag. t. 6245.
South Africa.

13. D. ANGUSTILOBA N. E. Br. *l. c.* 1883, ii. 230; in Ic. Pl. t. 1925.
Karroo, Griqualand West.

14. D. CORDEROYI N. E. Br. in Bot. Mag. t. 6082 (1874). *Stapelia Corderoyi* Hk. f. *l. c.*
Orange River.

15. D. TRANSVAALENSIS Schltr. in Engl. Bot. Jahrb. xx. Beibl. 51, 54 (1895). *D. dentata* N. E. Br. in Kew Bull. 1895, 265.
Transvaal, Bechuanaland.

16. D. CONCOLOR Schltr. *Stapelia concolor* Salm. Dyk.
South Africa.

XLIV. CARALLUMA R. Br. in Mem. Wern. Soc. i. 14 (1809); Dcne. in DC. Prodr. viii. 647 (1844); N. E. Br. in Gard. Chron. 1892, xii. 369. *Boucerosia* Wight & Arn. Contrib. 34; Dcne. *l. c.* viii. 648 (1844). *Ouaqua* N. E. Br. in Gard. Chron. 1879, xii. 8. *Piaranthus* R. Br. in Mem. Wern. Soc. 23 (1809); Dcne. *l. c.* viii. 650; Benth. & Hk. f. Gen. Pl. ii. 782 (1876). *Obesia* Haw. Syn. Pl. Succ. 42 (1812).

1. C. LUTEA N. E. Br. in Ic. Pl. xx. t. 1901 (1890).
Orange Free State, Griqualand West, Transvaal, Natal.

2. C. ARMATA N. E. Br. *l. c.* t. 1902.
Little Namaqualand.

3. C. MAMMILLARIS N. E. Br. *l. c.* sub t. 1902. *Stapelia mammillaris* L. Mant. ii. 216 (1771). *S. pulla* Ait. Hort. Kew. ed. 1, i. 310 (1789); Mass. Stap. 21, t. 31 (1796). *Boucerosia mammillaris* N. E. Br. in Journ. Linn. Soc. Bot. xvii. 165, t. ii. f. 5–13 (1890).
Little Namaqualand.

4. C. LINEARIS N. E. Br. in Ic. Pl. xx. t. 1903 (1890).
Zwartberg.

5. C. HOTTENTOTTORUM N. E. Br. *l. c.* sub t. 1903. *Ouaqua hottentottorum* N. E. Br. in Gard. Chron. 1879, xii. 8, f. 1.
Namaqualand.

6. C. RAMOSA N. E. Br. in Ic. Pl. t. 1904 (1890). *Stapelia ramosa* Mass. *l. c.* 21, t. 32 (1796); Willd. Spec. i. 1288; Schultes, Syst. vi. 22; Haw, Syn. Pl. Succ. 23 (1812); Don, Gen. Syst. Gard. iii. 116; Dcne. *l. c.* viii. 658 (1844).
Karroo.

7. C. APERTA N. E. Br. *l.c.* t. 1905 (1890). *Stapelia aperta* Mass. *l.c.* 23, t. 37 (1796); Willd. *l.c.* i. 1285; Schultes, *l.c.*; Haw. *l.c.* 23 (1812); Dcne. *l.c.* viii. 658 (1844).
Little Namaqualand.

8. C. ARIDA N. E. Br. in Gard. Chron. 1892, xii. 369. *Stapelia arida* Mass, *l. c.* 21, t. 33 (1796). *Piaranthus aridus* Don, *l. c.* iv. 114; Dcne. *l. c.* viii. 650 (1844).
Swellendam.

9. C. INCARNATA N. E. Br. *l. c.* *Stapelia incarnata* L. f. Suppl. 171 (1781); Mass. *l.c.* 22, t. 34 (1796). *Piaranthus aridus* Don, *l.c.* iv. 114; Dcne. *l.c.* viii. 650 (1844). *Boucerosia incarnata* N. E. Br. in Journ. Linn. Soc. Bot. xvii. 166, t. 11, f. 14–17 (1878).
Saldanha Bay, Hopefield.

10. C. PARVIFLORA N. E. Br. in Gard. Chron. xii. 370 (1892). *Stapelia parviflora* Mass. *l.c.* 22, t. 35 (1796); Don, *l.c.* iv. 113. *Piaranthus parviflorus* Sprgl. Syst. i. 841; Dcne. *l. c.* viii. 650 (1844). *Caralluma dependens* N. E. Br. in Ic. Pl. xx. t. 1903 (1890).
Little Namaqualand, Clanwilliam, Van Rhyndorp, Calvinia.

11. C. PRUINOSA N. E. Br. in Gard. Chron. xii. 370 (1892). *Stapelia pruinosa* Mass. *l.c.* 24, t. 41 (1796); Willd. *l.c.* i. 1287; Roem. & Schult. *l.c.* vi. 35; Dcne. *l.c.* viii. 657 (1844). *Tromotriche pruinosa* Haw. *l.c.* 37; Don, *l.c.* iv. 119.
Little Namaqualand.

12. C. CHLORANTHA Schltr. in Engl. Jahrb.
George, Karroo.

13. C. INTERMEDIA Schltr. *Stapelia intermedia* N. E. Br. in Ic. Pl. xx. t. 1910 (1890).
Clanwilliam.

14. C. DECORA Schltr. *Stapelia decora* Mass. Stap. 19, t. 20 (1796). *Obesia decora* Haw. Syn. Pl. Succ. 43 (1812). *Piaranthus decorus* N. E. Br. in Journ. Linn. Soc. Bot. xvii. 163 (1878).
Victoria West, Little Namaqualand.

15. C. GEMINATA Schltr. *Stapelia geminata* Mass. *l.c.* 18, t. 25 (1796); Willd. Spec. i. 1290; Roem. & Schult. Syst. vi. 42; Bot. Mag. t. 1326; Dcne. in DC. Prodr. viii. 661 (1844). *Piaranthus geminatus* N. E. Br. *l.c.* 163. *Obesia geminata* Haw. Syn. Pl. Succ. 42; Don, Gen. Syst. iv. 121.
Karroo, Beaufort West.

16. C. SERRULATA Schltr. *Stapelia serrulata* Jacq. *l. c.* t. 17; Willd. Enum. 286; Roem. & Schult. *l.c.* 47; Dcne. *l.c.* viii. 658 (1844). *Piaranthus serrulatus* N. E. Br. *l. c.* 163. *Caruncularia serrata* Haw. *l.c.*; Don, *l.c.* iv. 122.
South Africa.

17. C. PUNCTATA Schltr. *Stapelia punctata* Mass. *l.c.* 18, t. 24 (1796). *Obesia punctata* Haw. *l. c.* 43. *Piaranthus punctatus* R. Br. in Mem. Wern. Soc. i. 23; Dcne. *l. c.* viii. 650 (1844); N. E. Br. *l.c.* 163 (1878).
South Africa.

18. C. COMPTA Schltr. *Piaranthus comptus* N. E. Br. in Ic. Pl. t. 1924 (1890).
"Karroo."

19. C. GRIVANA Schltr. *Piaranthus grivanus* N. E. Br. *l. c.* t. 1924.
Griqualand West.

XLV. STAPELIA L. Gen. Pl. 307; R. Br. in Mem. Wern. Soc. i. 23 (1809); Endl. Gen. 3524; Dcne. in DC. Prodr. viii. 652; Haw. Syn. Pl. Succ. 14. *Gonostemon* Haw. Syn. Pl. Succ. 27 (1812). *Tridentea* Haw. *l. c.* 34. *Tromotriche* Haw. *l. c.* 36. *Orbea* Haw. *l. c.* 37. *Caruncularia*, *l. c.* 33.

1. S. ACUMINATA Mass. Stap. 15, t. 17 (1796); Willd. Spec. i. 1281; Schultes, Syst. vi. 21; Haw. *l. c.* 28; Don, Gen. Syst. Gard. iv. 116; Dcne. *l. c.* viii. 654.
Namaqualand.

2. S. AMBIGUA Mass. Stap. 13, t. 12 (1796); Jacq. Stap. t. 35; Haw. *l. c.* 17; Don, *l. c.* iv. 114; Dcne. *l. c.* viii. 652.
Africa australis.

3. S. ASTERIAS Mass. Stap. 14, t. 14 (1796); Jacq. Stirp. 47 (1819); Bot. Mag. t. 536; Don, *l. c.* iv. 115; Willd. *l. c.* i. 1280; Dcne. *l. c.* viii. 653.
Karroo.

4. S. ATROPURPUREA Salm. Dyk. Hort. Dyk. 372 (1834); Dcne. *l. c.* viii. 659.
Karroo.

5. S. BARKLYI N. E. Br. in Ic. Pl. xx. t. 1909 (1890).
Little Namaqualand.

6. S. BISULCA Don, Hort. Cant. ed. 3, 43 (nomen); Schultes, Syst. vi. 37; Dcne. *l. c.* viii. 659. *Orbea bisulca* Don, *l. c.* 120.
South Africa.

7. S. CANESCENS Hort. ex Haw. Syn. Pl. Succ. 26 (1812).
South Africa.

8. S. CONCINNA Mass. Stap. 15, t. 18 (1796); Don, *l. c.* iv. 116.
South Africa.

9. S. CONSPURCATA Willd. Enum. Hort. Berol. 284; Schultes, *l. c.* vi. 39; Don, *l. c.* 120; Dcne. *l. c.* viii. 660.
South Africa.

10. S. CORDATA Hort. ex Haw. Syn. Pl. Succ. 26 (1812).
South Africa.

11. S. DEFLEXA Jacq. Stap. t. 20 (1819); Schultes, *l. c.* vi. 46; Bot. Mag. t. 1890; Dcne. *l. c.* viii. 664.
South Africa.

12. S. DEJECTA Salm. Dyk. Hort. Dyk. 372 (1834); Dcne. *l. c.* viii. 659.
South Africa.

13. S. DISCOLOR Tod. Hort. Bot. Pan. i. 49, t. 12, f. 3 (1878).
South Africa.

14. S. DIVARICATA Mass. Stap. 17, t. 22 (1796); Jacq. Stap. t. 22; Bot. Mag. t. 1007 (1807); Don, *l. c.* iv. 117; Haw. Syn. Pl. Succ. 27 (1812); Willd. Enum. i. 280 (1797); Schultes, *l. c.* vi. 27; Dcne. *l. c.* viii. 655 (1844).
South Africa.

15. S. ERECTIFLORA N. E. Br. in Gard. Chron. vi. 650 (1889); in Ic. Plant. xx. t. 1921 (1891).
Clanwilliam, Karroo.

16. S. FASCICULATA Thbg. Prodr. Pl. Cap. 46; Flor. Cap. 170 (1820). *Piaranthus fasciculatus* Schultes, Syst. vi. 10; Dcne. *l. c.* iii. 650 (1844).
Calvinia.

17. S. FISSIROSTRIS Jacq. Stap. 23; Don, *l. c.* iv. 115; Dcne. *l. c.* 654 (1844).
South Africa.

18. S. FLAVICOMATA Haw. Syst. Pl. Succ. 8 (1812); Dcne. *l. c.* viii. 663 (1844).
South Africa.

19. S. FUSCATA Jacq. Stap. t. 46; Dcne. *l. c.* 657 (1844). *S. glauca* var. *β*, Haw. Syn. Pl. Succ. 37 (1812). *Tromotriche fuscata* Haw. *l. c.* 10 (1812); Don, *l. c.* iv. 119.
South Africa.

20. S. FUSCOPURPUREA N. E. Br. in Ic. Plant. xx. t. 1913 (1891).
South Africa.

21. S. GEMMIFLORA Mass. 14, t. 15 (1796); Willd. Spec. i. 1280; Schultes, Syst. vi. 33; Bot. Mag. t. 1839; Jacq. Stap. t. 24; Dcne. *l. c.* viii. 656 (1844). *S. gemmifera* Hort. ex Salm. Dyk. Hort. Dyk. 266.
"Platte Kloof," *Masson.*

22. S. GIGANTEA N. E. Br. in Gard. Chron. 1877, i. 684. *S. Plantii* McKen. ex N. E. Br. *l. c.*
Natal, Orange Free State, Transvaal.

23. S. GLABRIFLORA N. E. Br. in Gard. Chron. 1876, ii. 809, f. 149. *S. depressa* Hort. ex N. E. Br. *l. c.*
South Africa.

24. S. GLABRICAULIS N. E. Br. in Ic. Pl. xx. t. 1917 (1891). *S. tsomoensis* N. E. Br. *l. c.* t. 1918.
Kaffraria, Queenstown.

25. S. GLANDULIFLORA Mass. Stap. 16, t. 19; Jacq. Stap. t. 21; Smith, Exot. Bot. t. 71 (1805); Willd. Spec. i. 1284; Don, *l. c.* iv. 116; Dcne. *l. c.* viii. 654. *S. glandulifera* Don, *l. c.* 116 (1837). *S. hispidula* Hornem. Hort. Hafn. i. 251.
Clanwilliam, Van Rhynsdorp, Namaqualand.

26. S. GRANDIFLORA Mass. Stap. 13, t. 11 (1796); Haw. Syn. Pl. Succ. 16 (1812); Don, *l. c.* iv. 114; Dcne. *l. c.* viii. 652; N. E. Br. in Gard. Chron. 1877, vii. 558, f. 85. *S. flavirostris* N. E. Br. *l. c.* 558. *S. Arnoti* N. E. Br. in Ic. Pl. xx. t. 1915 (1891).
Uitenhage, Albany, Queenstown, Colesberg, Barkly, Somerset East, Griqualand West.

27. S. HAMATA Jacq. Stap. t. 50; Lodd. Bot. Cab. 242 (1818); Dcne. *l. c.* viii. 653.
South Africa.

28. S. HIRCOSA Jacq. Stap. t. 25; Willd. Enum. 281 (1809); Dcne. *l. c.* viii. 656. *S. moschata* J. Don, Hort. Cant. ed. iii. 43 (1804), nomen; Lodd. Bot. Cab. t. 1051. *Tridentea moschata* Haw. Syn. Pl. Succ. 35 (1812), nomen.
Barkly, Griqualand West, Murraysberg.

29. S. HIRSUTA L. Sp. Pl. 217; Jacq. Stap. t. 51, 52; Willd. Spec. i. 1278 (1797); Ait. Hort. Kew. ed. 2, ii. 85 (1811); Mill. Icon. 172, t. 258 (1758); Jacq. Misc. i. 28, t. 3 (1778); Hook. Exot. Fl. iii. t. 230; Thbg. Prod. 46 (1794); Lam. Ill. t. 178, f. 2; Don, *l. c.* iv. 115; Dcne. *l. c.* viii. 653. *S. patula* Willd. Enum. 281; Dcne. *l. c.* viii. 652; N. E. Br. in Ic. Pl. xx. t. 1914. *S. cornata* Jacq. Stap. t. 49; Don, *l. c.* iv. 115; Dcne. *l. c.* viii. 653. *S. depressa* Jacq. *l. c.* t. 55. *S. sororia* Mass. Stap. 23, t. 39 (1796); Jacq. *l. c.* t. 57, 58; Lodd. Bot. Cab. t. 94; Dcne. *l. c.* viii. 652. *S. unguipetala* N. E. Br. in Gard. Chron. 1877, i. 334, f. 54. *S. affinis* N. E. Br. *l. c.* t. 1912 (1891).
Caledon, Tulbagh, Worcester, Victoria West.

30. S. INODORA Haw. Suppl. Pl. Succ. 12 (1819); Dcne. *l. c.* viii. 661.
"South Africa."

31. S. LANIFERA Haw. *l. c.* 8; Dcne. *l. c.* viii. 663. *S. pulvinata* Donn, Hort. Contrib. ed. 4, 53 (1807).
South Africa.

32. S. LEPIDA Jacq. Stap. t. 43; Willd. Enum. 280; Schultes, *l. c.* iv. 30; Dcne. *l. c.* viii. 661. *S. limosa* Hort. ex Salm. Dyk. Hort. Dyk. 266 (1834). *Podanthes lepida* Haw. *l. c.* 34. *Orbea lepida* Don, *l. c.* iv. 121.
South Africa.

33. S. LUCIDA DC. Cat. Hort. Monsp. 148 (1813); Dcne. *l. c.* viii. 652; Don, *l. c.* iv. 114; N. E. Br. in Ic. Pl. x. t. 1919 (1890).
Caledon, Swellendam, George.

34. S. MACOWANI N. E. Br. in Ic. Pl. xx. t. 1920 (1891).
Albany, Somerset East.

35. S. MACULOSA Jacq. Stap. t. 31; Willd. *l. c.* 282; Roem. & Schult. *l. c.* vi. 36; Dcne. *l. c.* viii. 658. *S. mixta* Donn, Hort. Cant. ed. 4, 53 (1807), nec Mass. *Orbea maculosa* Haw. *l. c.*; Don, *l. c.*
South Africa.

36. S. MARGINATA Willd. Enum. Suppl. 13; Schultes, *l. c.* vi. 39; Dcne. *l. c.* viii. 659. *Orbea marginata* Don, *l. c.* iv. 120.
South Africa.

37. S. MASSONI Haw. *l. c.* 18; N. E. Br. in Gard. Chron. 1883, ii. 761.
South Africa.

38. S. MULTIFLORA DC. Cat. Hort. Monsp. 149 (1813); Schultes, *l. c.* vi. 18; DC. *l. c.* viii. 653 (1844).
South Africa.

39. S. MUTABILIS Jacq. Stap. t. 29; Dcne. *l. c.* viii. 661 (1844). *Orbea mutabilis* Don, *l. c.* iv. 121. *S. fuscata* Hort. Pan. ex Tod. Hort. Bot. Panorm. i. 47 (1876). *S. neglecta* Tod. *l. c.* *S. Passerini* Tod. *l. c.* *S. umbilicata* Thuret, ex Choix Gr. n. 2, 6 (1869), nomen.
South Africa.

40. S. NAMAQUENSIS N. E. Br. in Gard. Chron. 1882, ii. 648; in Ic. Pl. xx. t. 1908 (1891).
Little Namaqualand.

41. S. OBLIQUA Willd. Enum. Suppl. 13; Schultes, *l. c.* vi. 35. *Tromotriche obliqua* Don, *l. c.* iv. 119.
South Africa.

42. S. OLIVACEA N. E. Br. in Gard. Chron. 1875, i. 136; Bot. Mag. t. 6212. *S. eruciformis* Hort. ex N. E. Br. *l. c.*
South Africa.

43. S. OPHIONCULA Haw. Suppl. Pl. Succ. 27 (1819).
South Africa.

44. S. ORBICULARIS Andr. Bot. Rep. 439 (1807); Schultes, *l. c.* vi. 40; Dcne. *l. c.* viii. 660. *S. orbiculata* Don, Hort. Cont. ed. 3, 43 (1804), nomen. *Orbea orbicularis* Harv. *l. c.* 40.
South Africa.

45. S. PALLIDA Wendl. Coll. Bot. 39, t. 51; Dcne. *l.* c. viii. 655 (1844). *S. pallens* Hort. ex Steud. Nom. ed. 2, ii. 631 (1841).
South Africa.

46. S. PANICULATA Willd. Enum. Suppl. 13; Schultes, *l. c.* vi. 34; Don, *l. c.* iv. 118; Dcne. *l. c.* viii. 657.
South Africa.

47. S. PAPILLOSA DC. Pl. ex Desf. Tabl. ed. 2, 92 (1815), nomen.
South Africa.

48. S. PARVIPUNCTATA N. E. Br. in Ic. Pl. xx. t. 1923 (1891).
Nieuwe Veld.

49. S. PATENTIROSTRIS N. E. Br. in Gard. Chron. 1877, i. 140, f. 21. *S. Courcelli* Hort. ex N. E. Br. *l. c.* (1877). *S. sororia* Hk. f. Bot. Mag. t. 5953 (1872).
South Africa.

50. S. PEDUNCULATA Mass. Stap. 17, t. 21 (1796); Willd. *l. c.* i. 1284; Schultes, *l. c.* vi. 46; Dcne. *l. c.* viii. 658. *S. lævis* Dcne. in DC. Prodr. viii. 658 (1844). *S. penduliflora* Steud. Nom. ed. 2, ii. 631 (1841). *Caruncularia pedunculata* Haw. *l. c.*
Little Namaqualand.

51. S. PULCHELLA Mass. Stap. 22, t. 36 (1796); Poir. Encycl. 388; Willd. *l. c.* i. 1290; Dcne. *l. c.* viii. 655. *Podanthes irrorata* Haw. *l. c.* 33; Don, *l. c.* iv. 118.
South Africa.

52. S. PULVINATA Mass. Stap. 13, t. 13 (1796); Willd. *l. c.* i. 1279; Bot. Mag. t. 1240 (1815); Don, *l. c.* iv. 115; Dcne. *l. c.* viii. 654.
Worcester, Beaufort.

53. S. REFLEXA Haw. Suppl. Pl. Succ. 18 (1819); Dcne. *l. c.* viii. 652. *S. deflexa* Hort. ex Haw. *l. c.*; Don, *l. c.* iv. 114.
South Africa.

54. S. RETUSA Schultes, Syst. vi. 41; Dcne. *l. c.* viii. 660. *Orbea retusa* Don, *l. c.* iv. 120.
South Africa.

55. S. REVOLUTA Mass. Stap. 12, t. 10; Willd. *l. c.* i. 1277; Jacq. *l. c.* t. 45; Dcne. *l. c.* viii. 657; Bot. Mag. t. 724. *S. glauca* Jacq. *l. c.* t. 44; Schultes, *l. c.* vi. 35; Dcne. *l. c.* viii. 657. *S. protensa* Hornem. Supp. Hort. Hafn. 30. *S. tigridia* Dcne. *l. c.* viii. 657. *Tromotriche revoluta* Haw. *l. c.* 36; Don, *l. c.* iv. 119. *T. glauca* Haw. *l. c.* 37; Don, *l. c.* iv. 119.
Clanwilliam, Van Rhynsdorp, Calvinia.

56. S. RUFA Mass. Stap. 16, t. 20 (1796); Schultes, *l. c.* vi. 19; Willd. *l. c.* i. 1281; Haw. *l. c.* 20; Lodd. Bot. Cab. 239; Dcne. *l. c.* viii. 653.
South Africa.

57. S. RUFESCENS Salm. Dyk. Hort. Dyk. 373 (1834); Dcne. *l. c.* viii. 654.
South Africa.

58. S. SIMSII Schultes, Syst. vi. 73; Dcne. *l. c.* 656. *S. vetula* Sims in Bot. Mag. t. 1234, excl. syn. (1809). *Tridentea Simsii* Don, *l. c.* iv. 118.
South Africa.

59. S. SPECTABILIS Haw. Suppl. Pl. Succ. 16 (1819); Dcne. *l. c.* viii. 652. *S. grandiflora* Curt. Bot. Mag. t. 585. *S. Desmetiana* N. E. Br. in Gard. Chron. 1889, vi. 684; in Ic. Pl. xx. t. 1916 (1891).
South Africa.

60. S. STELLARIS Haw. Suppl. Pl. Succ. 9 (1819); Jacq. Stap. t. 49.
South Africa.

61. S. STRICTA Bot. Mag, t. 2037 (1819); Dcne. *l. c.* viii. 655. *Gonostemon strictum* Haw. *l. c.* Suppl. 12; Don, *l. c.* iv. 117.
South Africa.

62. S. STYGIA Schultes, Syst. vi. 32; Dcne. *l. c.* viii. 657. *Tridentea stygia* Haw. *l. c.* 36; Don, *l. c.* iv. 118.
South Africa.

63. S. TRIFIDA Tod. Hort. Bot. Pan. i. 47, t. 2, f. 1 (1876).
South Africa.

64. S. UNCINATA Jacq. Disp. Tab. *S. lunata* Sweet, Hort. Brit. ed. 2, 357 (1830).
South Africa.

65. S. VARIEGATA L. Sp. Pl. 217; Ait. Hort. Kew. i. 309; Willd. *l. c.* i. 1292; Thbg. Prodr. 46; Jacq. *l. c.* t. 39; Dcne. *l. c.*

viii. 659; Bot. Mag. t. 26. *S. angulata* Tod. *l. c.* i. 54, t. 13, f. 3. *S. atrata* Tod. *l. c.* i. 50, t. 13, f. 1. *S. clypeata* Jacq. *l. c.* t. 34; Schultes, *l. c.* v. 40; Dcne. *l. c.* viii. 660. *S. horizontalis* N. E. Br. in Ic. Pl. t. 1907 (1890). *S. marmorata* Jacq. *l. c.* t. 38; Schultes, *l. c.* vi. 40; Dcne. *l. c.* viii. 660. *S. bufonia* Jacq. *l. c.* t. 35; Willd. Enum. 283; Schultes, *l. c.* vi. 40; Dcne. *l. c.* viii. 660; Bot. Mag. t. 1676. *S. mixta* Mass. *l. c.* 23, t. 38; Willd. Spec. i. 1292; Schultes, *l. c.* vi. 56; Dcne. *l. c.* viii. 658. *S. normalis* Jacq. *l. c.* t. 42; Schultes, *l. c.* vi. 40; Bot. Reg. t. 755; Dcne. *l. c.* viii. 660. *S. picta* Don, Hort. Cant. ed. 3, 43; Dcne. *l. c.* viii. 661. *S. planiflora* Jacq. *l. c.* t. 40; Lodd. Bot. Cab. 191; Schultes, *l. c.* 38; Dcne. *l. c.* viii. 659. *S. rugosa* Jacq. *l. c.* t. 41; Willd. Enum. 284; Schultes, *l. c.* vi. 33; Dcne. *l. c.* viii. 656; Wendl. Coll. ii. 41, t. 52. *S. trisulca* Donn, *l. c.* ed. iii. 43; Jacq. *l. c.* t. 33. *S. Beffoniana* Hort. ex Schultes, Syst. vi. 49. *S. bidentata* Hort. ex Salm. Dyk. Hort. Dyk. 266. *S. Curtisii* Schultes, *l. c.* vi. 38; Dcne. *l. c.* viii. 659. *S. monostrosa* Hort. ex Steud. Nom. ed. 2, ii. 631. *S. Wendlandiantiana* Schultes, *l. c.* vi. 39; Dcne. *l. c.* viii. 659. *Orbea clypeata* Don, *l. c.* iv. 120. *O. bufonia* Haw. *l. c.* 40; Don, *l. c.* iv. 120. *O. marmorata* Don, *l. c.* 120. *O. mixta* Haw. *l. c.* 38. *O. normalis* Don, *l. c.* iv. 120. *O. planiflora* Don, *l. c.* iv. 120. *O. Wendlandiana* Don, *l. c.* iv. 120.

Cape Peninsula, Stellenbosch, Malmesbury, Tulbagh, Caledon, Swellendam, Bredasdorp, George, Humansdorp, Uitenhage, Albany.

66. S. VERRUCOSA Mass. *l. c.* 11, t. viii. (1796); Willd. *l. c.* i. 1291; Enum. 284, Jacq. Stap. t. 18; Dcne. *l. c.* viii. 655. *S. irrorata* Mass. *l. c.* 12, t. 9 (1796); Willd. *l. c.* i. 1296; Poir. Encycl. 388; Dcne. *l. c.* viii. 655. *Podanthes verrucosa* Haw. *l. c.* 33; Don, *l. c.* iv. 118. *P. irrorata* Haw. *l. c.* 33; Don, *l. c.* iv. 118.

Simonstown, Caledon, Riversdale, Uitenhage, Albany, Kaffraria, Queenstown.

67. S. VETULA Mass. Stap. 15, t. 16 (1796); Willd. *l. c.* i. 1291; Enum. 180; Schultes, *l. c.* vi. 33; Dcne. *l. c.* viii. 656. *Tridentea vetula* Haw. *l. c.* 35; Don, *l. c.* iv. 118.

Karroo.

XLVII. HUERNIA R. Br. in Mem. Wern. Soc. i. 22 (1809); Dcne. in DC. Prodr. viii. 650 (1844); Benth. & Hk. f. Gen. Pl. ii. 784 (1876). *Decodontia* Haw. Syn. Pl. Succ. 31 (1812).

1. H. CAMPANULATA R. Br. *l. c.* 22; Dcne. *l. c.* 651. *Stapelia campanulata* Mass. Stap. 11, t. 6 (1796); Bot. Mag. t. 1227; Jacq. Stap. t. 32 (1806); Willd. Spec. i. 1293; Ait. Hort. Kew. ii. 96.

Albany, Somerset East.

2. H. GUTTATA R. Br. *l. c.*; Dcne. *l. c.* *Stapelia guttata* Mass. *l. c.* 10, t. 4; Willd. Spec. i. 1294; Ait. Hort. Kew. ii. 96. *S. lentiginosa* Sims, Bot. Mag. t. 506 (1801); Ait. Hort. Kew. ii. 97. *Huernia lentiginosa* R. Br. *l. c.*; Dcne. *l. c.*; Haw. Syn. Pl. Succ. 29 (1812).

Clanwilliam, Van Rhynsdorp.

3. H. VENUSTA R. Br. *l. c.*; Dcne. *l. c.* *Stapelia venusta* Mass. *l. c.* 10, t. 3; Willd. Spec. i. 1294; Ait. *l. c.* 96; Jacq. Stap. t. 23.
South Africa.

4. H. BARBATA Haw. *l. c.* 28; Dcne. *l. c.* *Stapelia reticulata* Mass. *l. c.* 9, t. 2; Willd. *l. c.* 195; Ait. *l. c.*; Jacq. *l. c.* t. 20; Bot. Mag. t. 1662.
Clanwilliam, Calvinia.

5. H. TUBATA Haw. *l. c.* 30; Dcne. *l. c.* *H. duodecimfida* Sweet, Hort. Brit. ed. 2, 359 (1830). *Stapelia tubata* Jacq. Stap. t. 3; Lodd. Bot. Cab. 225; G. Don, Syst. iv. 113. *S. duodecimfida* Jacq. *l. c.* t. 4. *S. crassa* Donn, Hort. Cant. ed. 3, 43 (1804). *S. tubulosa* Hort. ex Steud. Nom. ed. 2, 632 (1841).
Karroo.

6. H. HUMILIS Haw. *l. c.* 30; Dcne. *l. c.* viii. 651 (1844); N. E. Br. in Ic. Pl. t. 1905 B (1890). *Stapelia humilis* Mass. *l. c.* 10, t. 5; Willd. *l. c.* i. 1294; Ait. Hort. Kew. ii. 96.
Karroo, Nieuweveld, Transvaal.

7. H. BARBATA Haw. *l. c.* 31; Dcne. *l. c.* *Stapelia barbata* Mass. *l. c.* 11, t. 7; Willd. *l. c.* 1293; Jacq. *l. c.* t. 46; Bot. Mag. t. 2401.
South Africa.

8. H. CRISPA Haw. *l. c.* 31; Dcne. *l. c.*
South Africa.

9. H. CLAVIGERA Haw. *l. c.* 10; Dcne. *l. c.* *Stapelia clavigera* Jacq. *l. c.* t. 5; Haw. *l. c.* 26. *S. campanulata* Sims, Bot. Mag. t. 1661. *S. clavata* Dcne. *l. c.* 664.
Albany.

10. H. OCELLATA Schultes, Syst. vi. 9 (1820); Dcne. *l. c.* *Stapelia ocellata* Jacq. *l. c.* t. 6; G. Don, Syst. iv. 113.
South Africa.

11. H. THURETII Cels. ex Henricq. L'Hort. en Franc. 73 (1866).
South Africa.

12. H. HYSTRIX N. E. Br. in Gard. Chron. i. 795 (1876). *Stapelia hystrix* Hk. f. Bot. Mag. t. 5751.
Natal, Orange Free State, Transvaal.

13. H. BREVIROSTRIS N. E. Br. *l. c.* 780; Bot. Mag. t. 6379.
Graaf Reinet

14. H. PRIMULINA N. E. Br. in Ic. Pl. t. 1906 (1890).
Albany, Queenstown.

15. H. LOESENERIANA Schltr. in Engl. Jahrb. xx. Beibl. 51, 55 (1895).
Transvaal.

16. H. STAPELIOIDES Schltr. *l. c.*
Transvaal.

XLVIII. DIPLOCYATHUS N. E. Br. in Journ. Linn. Soc. Bot. xvii. 167 (1878).

1. D. CILIATUS N. E. Br, *l. c.* 168; Thbg.
Calvinia.

XLIX. PECTINARIA Haw. Syn. Pl. Succ. Suppl. 14 (1819); Don, Gen. Syst. iv. 122.

1. P. ARTICULATA Haw. *l. c.* 14 (1819); G. Don, *l. c.* 122. *Stapelia articulata* Ait. Hort. Kew. ed. 1, i. 310 (1789); Mass. Stap. 20, t. 30 (1794).

Karroo.

Subtribe VI. MARSDENIEÆ.

L. GYMNEMA R. Br. in Mem. Wern. Soc. i. 33 (1811); Dcne. in DC. Prodr. viii. 621 (1844); Benth. & Hk. f. Gen. Pl. ii. 769 (1876).

1. G. SYLVESTRE Schult. Syst. vi. 57; Dcne. *l. c.* viii. 621. *G. subvolubile* Dcne. in Ann. Sc. Nat. ix. 277 (1838); & DC. Prodr. *l. c.*

Natal, Zululand, Transvaal, Delagoa Bay.

LI. TYLOPHORA R. Br. in Wern. Soc. i. 28 (1811); Dcne. in DC. Prodr. viii. 606 (1844); Benth. & Hk. f. Gen. Pl. ii. 770 (1876).

1. T. SYRINGIFOLIA E. Mey. Comm. Pl. Afr. Austr. 198 (1837); Dcne. *l. c.* 611.

Albany, Kaffraria, East Griqualand, Pondoland, Natal.

2. T. LYCIOIDES Dcne. *l. c.* 608. *Cynoctonum lycioides* E. Mey. *l. c.* 217.

Kaffraria, Pondoland, Natal, Zululand.

3. T. FLANAGANII Schltr. in Engl. Jahrb. xviii. Beibl. 45, 11 (1894).

Kaffraria, Natal.

4. T. UMBELLATA Schltr. *l. c.*

Kaffraria.

5. T. SIMIANA Schltr. *l. c.* 33.

Kaffraria.

6. T. BADIA Schltr. in Engl. Jahrb. xxi. Beibl. 54, 12 (1896). *Astephanus badius* E. Mey. *l. c.* 224; Dcne. *l. c.* 508.

Kaffraria.

LII. DREGEA E. Mey. Comm. Pl. Afr. Austr. 199 (1837); Dcne. in DC. Prodr. viii. 618 (1844); Benth. & Hook. f. Gen. Pl. ii. 778 (1876). *Pterophora* Harv. Gen. S. Afr. Pl. ed. 1, 223 (1838).

1. D. FLORIBUNDA E. Mey. *l. c.*; Dcne. *l. c.*

Humansdorp, Uitenhage, Albany, Kaffraria, East Griqualand, Natal, Transvaal.

LIII. PERGULARIA L. Mant. i. 8 (1767); Dcne. in DC. Prodr. viii. 618 (1844); Benth. & Hk. f. Gen. Pl. ii. 773 (1876).

1. P. AFRICANA N. E. Br. in Kew Bull. 1895, 259.

Natal.

LIV. FOCKEA Endl. Nov. Stirp. Mus. Vind. Icon. t. 91 (1838); Dcne. in DC. Prodr. viii. 545 (1844); Benth. & Hk. f. Gen. Pl. ii. 773 (1876). *Chymocormus* Harv. in Hook. Lond. Journ. Bot. i. 23 (1843).

1. F. edulis K. Sch. in Engl. Jahrb. xvii. 146 (1893). *Pergularia edulis* Thbg. Prodr. 38 (1794); Fl. Cap. 233 (1823). *Cynanchum crispum* Jacq. Fragm. t. 34, f. 5 (1809). *Brachystelma macrorrhizum* E. Mey. Comm. 197 (1837); Dcne. *l. c.* 647. *Chymocormus edulis* Harv. *l. c.* *Fockea capensis* Endl. *l. c.* t. 91; Dcne. *l. c.* 545. *F. glabra* Dcne. *l. c.*
Uitenhage, Albany.

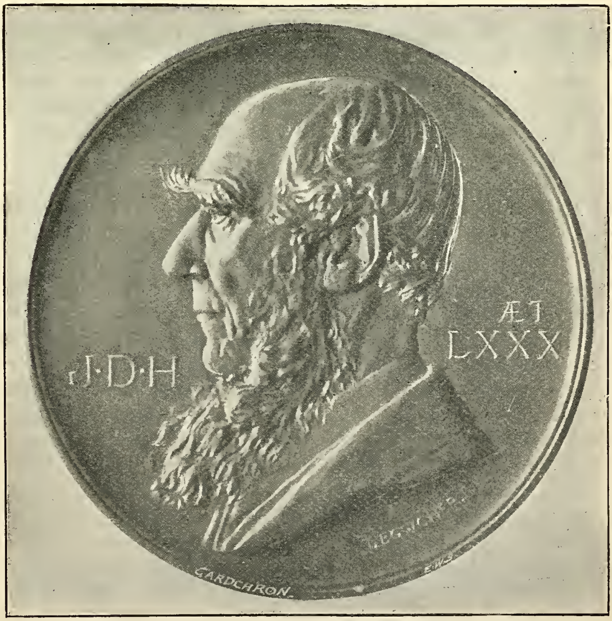
2. F. angustifolia K. Sch. *l. c.*
West Griqualand, Kenhart.

3. F. sessiliflora Schltr. in Engl. Jahrb. xx. Beibl. 51, 44 (1895). *F. undulata* N. E. Br. in Kew Bull. 1895, 260.
Transvaal.

LV. Lasiostelma Benth. in Benth. & Hk. f. Gen. Pl. ii. 776 (1876).
1. L. Sandersonii Oliv. Ic. Pl. t. 1449 (1884).
Natal.

THE HOOKER MEDAL.

By the kindness of the proprietors of the *Gardeners' Chronicle*, we are enabled to give an illustration of the gold medal presented by the Linnean Society at its last anniversary meeting to Sir Joseph Hooker, on the completion of the *Flora of British India*, and in recognition of his eminent services to biological science during a



period of sixty years. The presentation was made by Dr. Günther, the President of the Society, and was accompanied by a suitable address; Sir Joseph's speech acknowledging the presentation is printed in full in the recently issued part of the *Proceedings* of the Society, from which we reprint it. Sir Joseph said:—

"I cannot express my sense of the great, the exceptionally great honour which your Council has conferred upon me in the founding and awarding of this beautiful medal. In receiving it, let me assure you that I value it as much for the evidence it bears of the friendly regard of my associates as for their all too high estimate of my endeavours towards the promotion of science. Furthermore, let me say that from no scientific body could it be received by me with more cordial welcome than from the Linnean Society, which was the first to which I have the honour of belonging to enrol me amongst its Fellows, and which especially cultivates those branches of knowledge to which I have devoted the best years of my life. To these considerations must be added what you yourself have alluded to, namely, my hereditary interest in a Society of which my father and grandfather were very early Fellows, and both of them contributors to its *Transactions*. To this latter circumstance it may perhaps be due that I was elected at a very early age, being, I believe, the youngest member of our body with no further scientific claims on the support of my electors than that I was serving as a naturalist in the Antarctic expedition under Captain Ross, where I happened to be the youngest, as I am now the only surviving officer of those then under the command of that intrepid navigator. I may mention that Captain Ross was himself a Fellow, and had a copy of our *Transactions* in his cabin, which was a godsend to me. I was in the Falkland Isles when my election took place, and nearly a year and a half elapsed before my captain and I knew that we were fellow Linneans.

"In 1842 the Lord Bishop of Norwich was President. He was the first of ten under whom I have been privileged to sit. Had the Society adopted the rule of biennial presidents I should have sat under thirty at least, which, in my estimation, would have detracted greatly from the dignity which I attach to the chair, and I venture to think from its utility also. In the year 1842 there were 610 members of the Society (including fellows, foreign members, and associates), with fully one-fourth of whom I soon became personally acquainted. Twenty-eight years afterwards, that is about midway between the former date and the present time, the number of my personal friends in the Society had risen to one-half of the whole body. Our numbers are now 820, but the proportion of my personal friends among them has inevitably shrunk from my having outlived so many associates of my middle age. And this leads me to ask your indulgence for one more egotistical detail. It is that I am perhaps the only Fellow who personally knew four of the 169 naturalists who, 110 years ago, formed the nucleus of our Society. Of these four I knew two during my later teens: they were the Rev. W. Kirby, the author, with Spence, of the immortal *Introduction to Entomology;* and Dr. Heysham, of Carlisle, an excellent entomologist and ornithologist. The others were Aylmer Bourke Lambert, a former President, and the last, as I have been informed, who wore in the chair the presidential three-cornered hat; and Archibald Menzies, who as naturalist accompanied Vancouver in his voyage in the Pacific, and who introduced the *Araucaria imbricata* into England. These all died very near the year of my election.

"Referring now to the progress of the Society in status and efficiency during the years that have elapsed since 1842, the record cannot but be gratifying to its Fellows. Of this the best proofs are the increment in extent and value of its publications, and the interest taken in its meetings. From its foundation up to the date referred to (fifty-four years) eighteen volumes of the *Transactions* in quarto had been published. During the succeeding fifty-four years about double that amount have been produced in the same form, besides fifty-eight volumes of the *Journal* in octavo, which latter was not commenced till 1857.

"Then as regards attendance at the meetings, during the first years of my fellowship it was miserably small. If my memory does not deceive me, I recall a night in Soho Square when only five Fellows supported the President and Secretary. There was a dearth of papers too, and the discussion of such as were brought forward was discountenanced by the chair. All this is now happily a thing of the past, and I should not have alluded to those bad times had not the Society given proof of that inherent vitality which supported it under a temporary depression, and subsequently raised it to its present position.

"It remains, Sir, to thank you cordially for coupling my father's name with my own in this award, but for which, indeed, I could not have accepted it without a protest. I inherited from him my love of knowledge for its own sake, but this would have availed me little were it not for the guiding hand of one who had himself attained scientific eminence; who by example, precept, and encouragement kept me to the paths which I should follow; launched me in the fields of exploration and research, liberally aided me during his lifetime, and paved for me the way to the position he so long held at Kew with so great credit to himself, and benefit especially to our Indian and Colonial possessions."

THOMAS KIRK, F.L.S.

The death of Thomas Kirk, a valued contributor to this Journal, was briefly recorded in these pages shortly after its occurrence in March last, and I have delayed further notice in the hope of receiving detailed information from New Zealand as to his work there. This has not arrived, and it does not seem desirable to postpone any longer a brief record of the deceased botanist.

Thomas Kirk was born at Coventry in 1828, and during the earlier part of his life was occupied in a timber-mill in that town. At what date he took up the study of botany does not appear. His first published paper was on the ferns and fern allies of Warwickshire (*Phytologist*, ii. 809), which was followed by another on the rarer flowering plants of the county (*l. c.* 969); these appeared in 1847. A note on the occurrence of *Anacharis* in Northamptonshire appeared in the same journal in 1848. About 1858 he communicated to Mr. Watson a catalogue of plants seen by him in Warwickshire, accompanied by specimens. Mr. Bagnall, in his *Flora of Warwickshire*, says that Kirk paid attention to the mosses as well as to the flowering plants of the county; "he corresponded with several of the more prominent botanists of that day, such as Borrer, Babington, Bloxam, and W. G. Perry. To the herbarium of the [last-named] botanist he contributed many of the rarer flowering plants and a collection of mosses: these form part of the Perry herbarium in the Warwick Museum."

In 1863 Kirk emigrated to New Zealand; his departure, says Mr. Watson, was "a loss to our home botany." It was, however, a gain to New Zealand, for he at once took up the botany of the colony, and from that time until his death devoted himself assiduously to it. The first of his very numerous papers on New Zealand plants appeared in 1868 in the first volume of the *Transactions* of the New Zealand Institute, of which body he was then curator and secretary, and in whose *Transactions* most of his work was published. In 1874 he removed to Wellington, where he was appointed lecturer on natural science at Wellington College, which was affiliated to the New Zealand University.

Kirk's largest publication was *The Forest Flora of New Zealand*—a folio work containing 142 plates, executed under his direction, which was issued by the New Zealand Government in 1889. For a considerable period he had been engaged in the preparation of a "Student's Flora" of the Colony; this, we regret to learn, although partly in type, is but half finished. We trust that the material for completing it exists in the rough, as it will be difficult to find any one to carry it on who is possessed of the knowledge and experience of the late botanist. In connection with this work his attention was drawn to the unpublished plates prepared for Sir Joseph Banks in connection with Cook's first voyage; by permission of the British Museum authorities, impressions were taken from these and sent to New Zealand, where the Colonial Government proposed to publish them in a reduced form, with Kirk's identifications. The Banks and Solander plants were a source of continual interest to Kirk, and he was in frequent correspondence with me about them: one of his latest papers, on the "Botany of the East Cape District" (Trans. N. Z. Institute, xxix. 509 (1896)) is largely concerned with their collections. His later letters contained many allusions to his failing health, but the end came somewhat suddenly on the 8th of March last, at Plimmerton, near Wellington.

JAMES BRITTEN.

SHORT NOTES.

Botrychium australe Br.—In the *Bulletin of the Torrey Club* for October (p. 532), Prof. L. M. Underwood quotes the description of this plant from Brown's *Prodromus*, and adds: "This brief description is utterly unsatisfactory, and, were it not for Robert Brown's plant at the Kew Herbarium together with several other plants from the type locality or from other portions of the Australian region, we might very easily unite this species with almost any of the others." Further on he speaks of the Kew plant as "Brown's type." I had imagined it was sufficiently known that the types of Brown's *Prodromus*, named and numbered by himself in accordance with that work, were in the National Herbarium, whence duplicates were sent to Kew and Edinburgh when Brown's collections were distributed (see Journ. Bot. 1876, 192). In one of the actual types of *B. australe* the sterile lamina is much larger than in the Kew specimen, being 13 cm. high and 9 broad: the locality of these is given by Brown on the accompanying ticket as "Parramatta, Port Jackson." We have two other sheets, authenticated by Brown, of specimens sent from Paramatta by Caley in 1803; in his MSS. the plant is localized—"Campi graminosi oræ orientalis Novæ Hollandiæ, in vicinitate Portus Jackson, Parramatta, &c., et ad fluvium Derwent."—James Britten.

Notes on Cambridgeshire Plants (p. 246).—My object in compiling the tables of Cambridgeshire extinctions (pp. 247–8) was to give a complete list of those plants which have undoubtedly occurred in the county, but which are now, so far as is known, no longer to be found therein. The first table comprised forty-nine species. With the probable exceptions of *Sisymbrium Irio*, *Mentha rotundifolia*, and *Setaria viridis*, and possibly that of *Hieracium murorum*, these have, on excellent authority, at some time occurred as wild plants in the county. Some few, notably *Lathyrus Nissolia* (which Mr. Fryer has found near the boundary at Pidley), *Carex teretiuscula*, and *Centunculus minimus*, may be rediscovered; but at least forty are permanently lost. The paragraph which followed dealt with such Gamlingay plants as were not, like *Malaxis* and *Rhynchospora alba* (which occurred only in the wettest parts), quite extinct in 1860. Several even of these are not now to be found there. The fact that they occurred nowhere else in the county does not render their extinction therein any the less a matter for concern. In the last table I enumerated twenty-seven species for which there are no recent records. It is quite possible that more than half of these do still occur, but having searched carefully but unsuccessfully for some of them, I think it open to doubt. The localities in which *Antennaria dioica*, *Hypochœris glabra*, *Botrychium Lunaria*, *Herminium Monorchis*, &c., have occurred (and may still occur) have undergone considerable alteration of late years. *Lastræa spinulosa*, *Apera Spica-Venti*, *Crepis fœtida*, *Glyceria distans*, and two or three others will very likely be found again. Altogether, however, it is morally certain that fifty-five, and most probable that sixty-five, plants formerly indigenous in Cambridgeshire are now extinct therein.

Such a number is unusually large. It is surpassed in Middlesex, but I imagine is not nearly approached in any other fully-investigated county, even if comparable in size with Cambridge. In Surrey the list of extinctions can hardly number twenty-four, and the comparison with a large county is still more striking. In the whole county of Yorkshire I do not think that there are more than a dozen extinctions; in the West Riding, itself larger than any other English county, there are not more than half that number. The truth is that quite an exceptional number of destructive factors have been at work in Cambridge. Of the three main physiographical divisions of the county the clay districts (in the south-west and south-east) have hardly suffered at all from the botanical point of view, but it is far otherwise with the fen and chalk districts. Moreover, many plants were entitled to a place in the flora owing to their occurrence nowhere but in one of three isolated tracts—the greensand at Gamlingay, the salt-marshes at Wisbech, and the small patch (resembling the adjoining "breck" country in Suffolk) at Chippenham. Most of the Chippenham plants are still to be found there, but in the two other and more important districts the transformation which has taken place has been unusually prejudicial to their special plants, and therefore to the county flora.

Concerning my note on *Calamagrostis epigeios* (p. 259), Dr. F. Arnold Lees assures me that it was not abundant, "not even obtrusively observable," in Wicken Fen in 1868–1871. He writes:—"Old species have gone or are going, new (natives) are replacing them naturally. Purview of any square mile almost in our last over fifty years will bear this observation out. I know several Lincolnshire tracts, never encroached on by man or his drain-pipe, that were sphagnous bogs in 1870 that now are covered with *Erica cinerea* and young *Pinus*, and have thousands of *Gentiana Pneumonanthe* flowering thereon where not one was twenty-eight years ago."—W. West, Jun.

Bucks Plants.—I was fortunate enough this autumn to find the *Utricularia* in the Burnham Beeches ponds in flower. It was at once evident that Mr. Druce was right in his opinion that the plant is *U. neglecta*. Looking over an old collection of Bucks plants, I find specimens of both this and *Nitella translucens*, gathered in these ponds many years ago, with a note of the great abundance of the latter in the adjoining upper pool; also specimens of two plants of *Osmunda regalis* secured the same day in a boggy part of these woods, locally known as "Egypt." Whilst treating of the flora of the neighbourhood, I may add that a bramble of the Suberecti group, which has long been noticed by me growing on the border of Hawk Wood, Alderbourne, near Fulmer, has been identified by Rev. W. Moyle Rogers as *R. Rogersii* Linton.—J. Benbow.

A Nomenclature Note.—In the August number of the *Kew Bulletin* (p. 198) Mr. R. A. Rolfe has described a new genus of orchids from British Guiana under the name *Jenmania*, a name which in the previous year had been adopted by Herr W. Wachter for a genus of lichens (*Flora*, 1897, 349). I have studied this lichen from the original specimens, and have pointed out that this genus represents a good new type of the group Glœolichenes (Verhandl. k. k. Zool.-Bot. Ges. Wien, xlviii. [289). It is therefore necessary to recognize its priority over the orchid genus, for which latter I propose the name of *Rolfea*, and for the species that of *Rolfea elata*.—A. Zahlbruckner.

Arctium nemorosum Lej. in Worcestershire. — In looking over some plants collected in 1885, I find that I have specimens of the above, gathered from three stations in the neighbourhood of Malvern. It has not, I believe, hitherto been recorded for this county. —Richard F. Towndrow.

Dianthus gallicus in Jersey. — From Mr. G. C. Druce I have received specimens of a pink, which were sent to him for identification. They were from St. Ouen's Bay, on the west side of Jersey, and were tentatively labelled "*Dianthus cæsius*" by the collector. They certainly do not belong to this species, but almost exactly match specimens of *Dianthus gallicus* which I have examined, and fit in with the descriptions of this plant. *D. gallicus* is a maritime species, which in France extends from the Gironde to Brest, while *D. cæsius* grows on mountain limestone. I am informed that it grows under conditions which preclude it from being otherwise than truly wild.—F. N. Williams.

Cerastium arcticum Lange (p. 440). — Mr. Marshall's note has prompted me to refer to Mr. N. E. Brown's remarks on *C. latifolium* as a British plant in the Supplement to *English Botany*, p. 42 (1891). He says: "On comparing the seeds of typical *C. latifolium* with those of the British plant that has been so named, including var. *Edmonstoni*, I do not find any difference of kind, but only a difference of degree; the seeds of the British plant are smaller than those of typical *C. latifolium*, although considerably larger than those of *C. alpinum*, but the testa of thoroughly ripe seeds is loose, although nothing like so inflated as in *C. latifolium*, . . . so that I think our plant is really *C. latifolium*, but a form with smaller seeds, for which the varietal name, *Smithii* Syme, may be retained." I have examined the material indicated by Mr. N. E. Brown, and am disposed to concur with him in adding *C. latifolium* to the British flora. I do not, however, agree with him in identifying *C. arcticum* with *C. latifolium* var. *Edmonstoni*, though there may be some difficulty in distinguishing them (in the dried state). All the more reason is there against according to *C. arcticum* specific rank. Were the characters adduced by Mr. Marshall to be considered of specific importance, I am afraid that the 123 species enumerated in the November number of the *Bulletin de l'Herbier Boissier* would have to be trebled.—F. N. Williams.

Jungermania obtusa in Britain. — Amongst Mr. Symers M. Macvicar's collection of Hepaticæ in West Inverness is a species new to Britain—*Jungermania obtusa* Lindb. After examining it, I had no doubt it was that species, but to make quite sure I submitted specimens to Drs. Kaalaas and Jórgensen, who confirm it. Hitherto it has only been found in Northern Europe, Styria, and Switzerland.—W. H. Pearson.

NOTICES OF BOOKS.

Revisio Generum Plantarum vascularium omnium atque cellularium multarum secundum leges nomenclaturæ internationales cum enumeratione plantarum exoticarum in itineribus mundi collectarum. Pars III^{II}. By Dr. Otto Kuntze, Leipzig, 28 Sept. 1898. 8vo, pp. vi, *201*, 576. Price 28 marks.

As set out in the title, this work deals with two kinds of botanical matter—(1) a revision of the names of genera; (2) an enumeration of plants collected; each is full of learned information, and is done in a truly scientific manner.

The laws of nomenclature are discussed afresh in detail, and two long sections give an account of most of the literature on the subject from 1893 to 1896; another section deals with the new code of April, 1897, which was drawn up by Berlin botanists, and signed by Dr. Engler and thirteen others. This is criticized in a masterly way, and some of its novel proposals are shown to be objectionable; the fourteen rules of the code are attacked in seventeen annotations. Few will agree with Dr. Kuntze in considering that generic names published prior to the Linnean method of nomenclature (1753) should oust other names then used by Linnæus, or subsequently published by him or other authors. Dr. Kuntze goes back for this purpose to 1735, the date of the first edition of the *Systema Naturæ* of Linnæus. Bentham and Hooker, in 1862, in the preface to the first part of their *Genera Plantarum*, began with the statement—"Linnæus generis inventor fuit"; but on the completion of the first volume in 1867 this statement was changed into "Linnæus primus Nomenclaturæ generum et specierum leges certas præscripsit"; and although in terms they altogether neglect only ante-Linnean names, they do not in general quote Linnean genera earlier than those used in the sixth edition of Linnæus' *Genera Plantarum* of 1764. Dr. Kuntze, having in the previous parts of his *Revisio* renamed a large number of species in accordance with his principles, points out that many more changes must be made if 1753 is taken as the starting point for genera.

The most arbitrary innovation introduced into the Berlin code is Rule 2, which presumes to bar generic names that have not come into general use during fifty years, counting from their establishment, unless they were again taken up in a monograph or large flora in accordance with the laws of nomenclature of 1868. This rule is valiantly resisted by Dr. Kuntze, who, besides arraying powerful arguments of his own against it, quotes adverse opinions of several botanists from widely distributed centres of thought, including that of the *Journal of Botany* of August, 1897, and the following of Dr. N. L. Britton:—"The application of the ideas embodied in this paragraph would lead to great uncertainty in very many cases, and we do not believe that the Berlin botanists will long maintain them. How they can consistently decide on what is 'general use,' as compared with that we may term 'special use,' is more than we can imagine; and who is to determine what descriptive volume is a 'monograph,' or what flora a 'large' one, is equally difficult to understand; and how are they to determine in many cases whether the author has or has not followed the Paris Code of 1867? or will calling a brochure a 'monograph' make it one?"

Supplementary emendations to the code of botanical nomenclature are given in three languages, German, English, and French; also a complete edition of the Paris Code as proposed to be amended is given in Italian.

In a very useful section Dr. Kuntze supplies information additional to what is given in Pritzel's *Thesaurus* relating to the exact dates of publication of botanical literature. From the nature of the case this is fragmentary, and capable of further additions, which it is to be hoped bibliographers will contribute from time to time. A case in point is that of Palisot de Beauvois' *Flore d'Oware et de Benin*. This work consists of two volumes bearing the dates on their titles of 1804 (= 12 of the French Republic) and 1807 respectively; and each volume comprises ten parts, which were issued separately, each part containing six plates. It appears from Pritzel that the last part of the second volume did not appear until 1818 or 1821, and from internal evidence it is clear that many parts of the second volume were subsequent to 1807, as Dr. Kuntze points out. It may be mentioned that there exist in the Botanical Department of the Natural History Museum fronts of the covers of parts vii. and xii., which show that these parts, belonging respectively to plates 37 to 42 and 67 to 72, bore the dates of 1806 and 1810. Some portions of the work were apparently published in advance; indeed, *Napoleona*, tab. 78 in part xiii. (1810), was published as early as 1806 under the name *Napoleonæa*. From *Flora*, 1822, i. Beilage i. band 1, p. 4, it appears that part xvii. tt. 97–102, was published in 1818.

Dr. Kuntze's reforms and criticism on nomenclature are calculated to disturb the equanimity of many of our most respected and especially of our older botanists, for they involve unexpected and often wholesale changes in nomenclature, and are highly controversial in character. It is only fair to bear in mind that, while he is full of deep erudition on the literature of the subject, he is no mere bookman, but also is very well acquainted with plants both in the field and in the herbarium, and he therefore approaches the questions as to the best methods of naming plants adequately armed with the proper weapons for the purpose. In this part of his work he enumerates thousands of plants of his own collection, including some new genera and more than 400 new species of vascular plants, with descriptions, besides numerous varieties; the chief portion of these was determined by himself, but rather more than one hundred of the new species are due to twenty-one other botanists who have contributed help in special groups. In this way his methods are exhibited in a practical form, and such defects as are inherent therein are exposed to public view, and can be condemned where necessary.

The collections were made partly in South America and partly in South Africa; the South American journey was taken from

December, 1891, to December, 1892, visiting Montevideo, Argentina, Chili, Bolivia, Patagonia, Mattogrosso, Paraguay, Uruguay, and Brazil; and the South African journey, to the Cape, the Orange Free State, the Transvaal, Natal, Portuguese East Africa, and Zanzibar, was taken from January to April, 1894. Patagonia yielded 32 new species, here described; Chili, 13; Bolivia, 146; Paraguay, 24; Uruguay, 2; Argentina, 57; Brazil (including Mattogrosso, etc.), 27; and South America altogether, 300; the Cape, 44; the Orange Free State, 1; the Transvaal, 8; Natal, 44; Portuguese East Africa, 5; and South Africa altogether 102 newly described species; the new species of cellular plants have not been reckoned in this summary. The new genera with descriptions or diagnoses are as follows:—*Montiopsis* O. Ktze. (Portulacaceæ), from Bolivia. *Neocracca* O. Ktze. (Leguminosæ), from Bolivia. *Atomostigma* O. Ktze. (Rosaceæ), from Mattogrosso. *Anisothrix* O. Hoffm. (Compositæ), from the Cape. *Sphæreupatorium* O. Ktze. = *Eupatorium* § Sphæreupatorium (Compositæ), from Bolivia. *Eupatoriola* O. Ktze. = *Baccharis* § Eupatoriola (Compositæ), from Bolivia. *Liabopsis* O. Ktze. = *Liabum* § Liabopsis (Compositæ), from Bolivia. *Synedrellopsis* Hieron. & O. Ktze. (Compositæ), from Argentina; and *Tunaria* O. Ktze. (Solanaceæ), from Bolivia.

Some points for remark arise in the course of the enumeration of the species: for instance, *Spergularia* Pers. (1805) is called *Buda* Adans. (1763), as did Dumortier; but this identification is very doubtful, for Adanson gives for his plant "*Alsine spergula major semine foliaceo* Mor. Dill. Eph. Nat. cent. 5. t. 4." Dillenius, in Acad. Cæs.-Leop. Nat. Eur. Ephem. v. & vi. pp. 270, 275, t. 4 (1717), describes and figures the plant, which he calls *Spergula semine limbo foliaceo cincto*, and in the description he says (p. 276), "vascula . . . . quinquefariam dehiscunt"; he also quotes Morison; this plant is *Spergula arvensis*. Morison in his Plant. Hist. ii. p. 551, sect. 5, tab. 23 (1680) calls the plant quoted *Alsine annua semine foliaceo nigro circulo membranaceo albo cincto;* this also is *Spergula arvensis*, but the figure makes the capsules appear to be 3-valved, an appearance which may have deceived Adanson and misled modern botanists in the identification of *Buda*. There is, however, no doubt that *Tissa*, which Adanson published on the same page and immediately preceding *Buda*, is *Spergularia*. Another synonym of the latter is *Corion* Mitch. (1748, not 1746 as given by Dr. Kuntze), but the name is rejected by Dr. Kuntze, not because it was published prior to 1753, but on account of *Coris* L. (1737), which he considers as the same name and applicable to a perfectly distinct genus. There is again another competitor for the proper name of the genus, namely *Alsine* L. (1753), the claims of which require careful consideration. In Sp. Pl. (1753), p. 272, Linnæus placed only two species under *Alsine*, namely *A. media* and *A. segetalis;* the former is *Stellaria media* With. (1796), and the latter is a *Spergularia*. *Stellaria* L. *l. c.* pp. 421, 422 had seven species under that genus, all but the last of which are congeneric; it seems therefore best to retain the genus *Stellaria* and to include *Alsine media* in it; *Alsine* thus remains available to stand for *Corion* (1748), *Tissa* (1763), *Spergularia*

(1805), and *Lepigonum* (1818). On the contrary, Dr. Kuntze prefers to sink *Stellaria* in *Alsine*, and in this sense to use the latter name.

In *Malvaceæ* the principal change made in the names of genera is the use of *Lassa*, which is adapted from *Lass* Adans. (1763), instead of *Malache* Trew (1772), which Dr. Kuntze had substituted in the first part of his book for *Pavonia* Cav. (1786); he quotes as a synonym *Abutilon* Plum. (1755), which on this showing would appear to be the correct name in preference to *Lass*. On referring, however, to Plum. Pl. Amer. fasc. i. p. 1, t. i., it is seen that Plumier really called the plant "*Hibiscus* foliis cordatis crenatis indivisis capsulis spinosis," and that he did not regard it as *Abutilon*.

In *Rhamnaceæ*, *Helinus* E. Mey. (1840) gives way to *Mystacinus* Rafin. (1838); and in *Leguminosæ*, *Cracca* Benth. non L., which in part i. had been called *Brittonamra* O. K. (1891), is now called *Benthamantha* Alefeld (1862).

Some extensive changes of a strictly botanical nature will meet with misgivings, at least on the part of those not in a good position to judge, on the reasonable ground that such matters ought to be left to be done, if at all, by the monographers of the particular orders affected. Thus in *Crassulaceæ* the genus *Sedum* is enlarged to include *Bryophyllum*, *Cotyledon*, *Crassula*, *Grammanthes*, *Kalanchœ*, *Monanthes*, *Rhodiola*, *Rochea*, *Sempervivum*, *Tillæa*, and others; and in *Convolvulaceæ*, *Aniseia*, *Astrochlæna*, *Bonamia*, *Breweria*, *Calonyction*, *Calystegia*, *Exogonium*, *Hewittia*, *Jacquemontia*, *Ipomœa*, *Merremia*, *Mina*, *Operculina*, *Pharbitis*, *Quamoclit*, *Prevostea*, *Seddera*, *Stylisma*, and *Volvulus*, are all made to fall under *Convolvulus*. Similarly in *Myrtaceæ*, *Eugenia* (including *Jambosa* and *Syzygium*), *Guajava* (*Psidium*), and *Myrceugenia* are all reduced to *Myrtus*.

The suppression of *Cyphia* Berg. (1767) seems unnecessary; the only pretext for doing this is because *Cuphea* P. Br. (1756), a considerable genus in another order, is kept up; and because both names are alike derived from the Greek word κυφός; on this account Dr. Kuntze has constructed the new name *Cyphopsis* for the former.

It might have been expected that he would not have adopted *Dichondra evolvulacea* Britton (1891) for *D. repens* Forst. (1776), and that he would have noticed that the latter name occurs in J. R. & G. Forst. Char. Gen. p. 40; he as well as Britton was probably misled by a slight error in the Kew *Index*, where p. 39 is quoted for this species, and on that page the genus only is given. *D. repens* was also named in G. Forst. Fl. Ins. Austr. Prodr. p. 21, n. 134 (1786), and there the original publication was correctly quoted. G. Forster's publication was known to both Dr. Britton and Dr. Kuntze, but they missed the first publication; and because the above plant has the synonym of *Sibthorpia evolvulacea* L. f. Suppl. Pl. p. 288 (1781), they thought it necessary to compound and to retain respectively the new name.

From the severely scientific style of his work in nomenclature, sentimental departures from the strict rule of priority of publication would scarcely be looked for, though to some minds such departures may come as a relief; however, some cases of it occur. In *Scrophulariaceæ*, *Nigrina* L. (1767) is preferred to *Melasma* Berg. of the same year, although it is admitted that Bergius published his *Plant. Carp.* in 1767, some weeks before the appearance of the *Mantissa* of Linnæus. There is a scandal in connection with this incident. According to an *ex parte* statement, the story goes that while the second volume of the twelfth edition of Linnæus's *Systema*, to which volume the *Mantissa* was appended, was being printed, the proof-sheets were corrected by Bergius's brother, and that Bergius saw the printer, and then put his own names to the genera and species of certain plants which were common to the *Mantissa* and to the collection with which he had to deal, as if he had not seen the former, and without making any acknowledgment; it was suggested that Bergius was too incompetent to assign new genera to their right places in the vegetable kingdom, or even correctly to understand floral organs. See Hall, *Epist. ined. C. Linn.* (1830), pp. 91, 103. On this account Dr. Kuntze ignores *Melasma*; Bentham & Hooker, in their *Genera Plantarum* (1876), retain it. For the same reason Dr. Kuntze prefers *Manulea* L. to *Nemia* Berg.

The convenient practice of printing the trivial parts of new names of species in a different type from those of old names has been followed, with a very few accidental exceptions. The pagination of the preface is given as usual in Roman numerals, but that of the rest is in two series, each in Arabic numerals, differing only in the thickness of the type; this small difference is apt to cause confusion, especially for the purpose of the index.

The above remarks are not intended appreciably to detract from the solid value which properly attaches to Dr. Kuntze's colossal labours, and which any one who seriously studies the book cannot fail to perceive. A correct nomenclature is of primary importance to all botanists, and their thanks are due to the author of this progressive step towards that end.

W. P. Hiern.

The Orchids of the Sikkim-Himalaya. By Sir George King and Robert Pantling. 4to, pp. 342, tt. 448 (Annals of the Royal Botanic Garden, Calcutta, vol. viii.). London: Quaritch. Price £6 6s. 0d. plain, £9 9s. 0d. half coloured.

We have done scant justice in these pages to the important and admirable work which has been published during the last ten years in connection with the Calcutta Gardens, under the capable direction of Sir George King; but we are anxious to call attention to this latest undertaking, not only because it is the last with which his name will be associated, but on account of its special interest and comprehensiveness. It is fitly dedicated to Sir Joseph Hooker, who monographed the *Orchidaceæ* for the *Flora of British India*, prior to the publication of which, as Sir George says in his modest preface, our knowledge of the smaller and more obscure species of the order had never been correlated, the descriptions being scattered through periodicals, "many of which were accessible only to botanical experts."

In Mr. Robert Pantling, of the Sikkim Government Cinchona Plantation, Sir George King found an able collaborator. Mr. Pantling had for many years occupied his leisure in making drawings of the orchids found on the Plantation, and the appearance of Sir Joseph Hooker's monograph suggested the desirableness of making the series complete; and this ultimately developed into the present work. Special collectors were sent into little-known districts, and the Government of Bengal undertook to publish the work. The drawings were put on the stone by natives of Bengal trained at the Government School of Art at Calcutta, and the colouring was done by the sons of Nepalese coolies employed on the Plantation—"boys who had never until Mr. Pantling took them in hand been accustomed to use any implement more delicate than a hoe." The results are most creditable to the lads, and to their persevering and skilful tutor. Mr. Pantling also assisted in the preparation of the letterpress, and has examined each specimen of the twelve sets of orchids issued to various representative herbaria. The ample tribute paid by Sir George King to the work of his colleague is gratifying evidence of the cordiality of the relations which subsisted between them.

In his short introduction Sir George makes some important suggestions as to the structure and classification of Orchids which, did space allow, we should like to reprint at length for the benefit of those who may find the volume difficult of access. The authors are convinced that the fertilization of orchids by insect agency "is by no means so universal as is sometimes supposed. We have found the most unmistakable evidence of self-fertilization in genera far removed from each other in every respect"—such as *Eria excavata*, *Dendrobium crepidatum*, *Calanthe Mannii*, and most of the species in *Goodyereæ*—one of the two tribes into which *Neottieæ* is separated. The separation is based on characters afforded by the pollen, which in the *Listereæ* is powdery (very rarely granular), while in *Goodyereæ* it is always granular or sectile.

Of the monograph itself it is sufficient to say that it is in every respect most carefully done. Each genus is provided with a clavis of species, and the descriptions are full and clear. Some novelties are described, but their number is small, as might be expected after the "sweeping-up" of the order by Sir Joseph Hooker and the papers published by the authors.

Sir George King is to be congratulated not only on this but on the admirable series of publications which have appeared under his directorship, as well as upon the fact that the reins of office so long and so successfully held by him have fallen to Dr. Prain, who may be trusted to carry on the work, in which he has already taken part, in accordance with the example set forth by his predecessor.

ARTICLES IN JOURNALS.[*]

Ann. Scottish Nat. Hist. (Oct.). — A. Bennett, 'Records of Scottish plants for 1897.'—J. W. H. Trail, 'Topographical Botany of Scotland.'

Bot. Notiser (häft 5; 1 Nov.). — K. Starbäck, 'Några märklika skandinaviska ascomycetfyd.' — O. Nordstedt, 'Ett par ord om de svenska *Odontites*-onterna.' — O. R. Holmberg, '*Spergula arvensis* var. nov. *oligogónata*.'

Bot. Centralblatt (Nos. 44, 45). — M. Woronin, '*Monilia cinerea* & *M. fructigena*.'—F. Höök, 'Zur Systematik der Kormophyten.'—E. Lemmermann, 'Zur Kenntniss der Plankton-algen.'—(Nos. 44–46). A. C. Hof, 'Histologische Studien an Vegetationspunkten' (concl.). — (Nos. 44–47). B. Schmid, 'Bau und Functionen der Grannen unserer Getreidearten.'—(No. 46).—G. Kükenthal, 'Neue oder kritische Uncinien' (*U. Wegeri*, sp. n.). — (No. 47). C. R. Barnes, 'So-called "Assimilation."'—J. Huber, *Hevea brasiliensis*. — (No. 48). R. H. True & C. G. Hunkel, 'The poisonous effect exerted on living plants by phenols.' — F. Ludwig, 'Leuchten unsere Süsswasserperidinien?'

Bot. Gazette (15 Oct.).—J. H. Schaffner, 'Karyokinesis in root-tips of *Allium Cepa*' (2 pl.).—E. L. Fulmer, 'Cell division in pine seedlings' (2 pl.).—F. D. Bergen, 'Popular American Plant-names.'—B. D. Halsted, 'The newer Botany.' — C. F. Millspaugh, 'Notes and new species of *Euphorbia*.'—J. B. S. Norton, 'Joseph F. Joor' (1848–92; portr.).

Bull. de l'Herb. Boissier (15 Nov.). — C. Meylan, 'Nouvelles stations bryologiques pour la chaine du Jura.' — R. Schlechter, 'Monographie der *Disperis*' (cont.). — H. Christ, 'Fougères de Mengtze, Yunnan.'—J. Freyn, 'Neue und bemerkenswerthe orientalische Pflanzenarten.'—F. N. Williams, 'Enumération provisoire des espèces du *Cerastium*.'

Bull. Torrey Bot. Club (15 Oct.). — L. M. Underwood, 'The ternate species of *Botrychium*.'—H. H. Rusby, 'Plants collected in South America' (cont.).—A. Nelson, 'New plants from Wyoming.'—(7 Nov.). G. V. Nash, 'Revision of *Triplasis*.'—C. De Candolle, 'Piperaceæ Bolivianæ.' — B. D. Halsted, 'Starch distribution as affected by fungi.' — A. A. Heller, 'Plants from N.W. America' (cont.).

Erythea (24 Oct.). — W. L. Jepson, *Beckwithia*, gen. nov.? (= *Ranunculus Andersonii* A. Gr.; 1 pl.). — Id., 'Henry Nicholas Bolander' (d. 1897; portr.).

Gard. Chronicle (22 Oct.). — *Linospadix* (?) *Petrickiana* (fig. 87). —(5 Nov.). *Ptychosperma Sanderiana* Ridley, sp. n.

Journal de Botanique ("1–16 Août," received 7 Nov.). — A. Franchet, 'Plantarum Sinensium' (cont.).—M. P. Guérin, 'Sur la présence d'un Champignon dans *Lolium temulentum*.'— —. Hue,

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[*] The dates assigned to the numbers are those which appear on their covers or title-pages, but it must not always be inferred that this is the actual date of publication.

'Causerie sur les *Parmelia*' (concl.). — A. de Coincy, *Boucerosia Munbyana* var. *hispanica.* — ("1–16 Sept.," received 19 Nov.). A. Franchet, 'Plantarum Sinensium' (cont.). — E. G. Camus, 'Plantes hybrides spontanées de la flore européenne' (cont.).— E. Bescherelle, 'Bryologiæ Japonicæ Supplementum I.'

Journ. Linn. Soc. (Nov. 1).—(No. 234). E. S. Barton, 'Structure and development of *Soranthera*' (2 pl.).—Id., 'Fruit of *Chnoospora fastigiata*' (1 pl.).—E. S. Salmon, 'Revision of *Symblepharis*' (2 pl.).—M. Christy, 'Seasonal variations of elevation in branch of Horse-chestnut.'—(No. 235). 'On the Subsubareas [*sic*] of British India, illustrated by the detailed distribution of *Cyperaceæ* in that empire' (map).

Oesterr. Bot. Zeitschrift (Nov.).—N. V. Archenegg, 'Zur Kenntniss der Blattborsten von *Cirsium horridum.*' — R. Schlechter, 'Revision der Gattung *Holothrix.*' — L. J. Celakovsky, 'Ueber petaloidumgebildete Staubgefässe von *Philadelphus* und *Deutzia.*'— A. Waisbecker, *Asplenium Forsteri.* — A. v. Hazek, *Gymnadenia Abelii*, nov. hybr. — V. Schiffner, 'Neue Moose der böhmischen Flora' (concl.).

BOOK-NOTES, NEWS, &c.

The activity shown by German botanists in the investigation of African plants has found a new outlet in a handsome series of large quarto monographs edited by Prof. Engler, two of which have been issued under the general title "Monographieen afrikanischer Pflanzen-familien und -Gattungen." The first, by Prof. Engler, deals with the *Moraceæ* (excluding *Ficus*); the second, for which Dr. Gilg is responsible, is devoted to the *Melastomaceæ;* each is illustrated by numerous excellent plates.

Perhaps the most noticeable point in the latter is the mass of additional African material that has come to hand since Prof. Cogniaux monographed the order only seven years ago. The African genera now number twenty-three. Dr. Gilg is responsible (either here or in the Nachträge to Engler & Prantl *Pflanzenfamilien*) for nine of these, namely *Afzeliella*, *Urotheca*, *Petalonema*, *Cincinnobotrys*, *Myrianthemum*, *Tetraphyllaster*, *Phæoneuron*, *Preussiella*, and *Orthogoneuron*. The first of these, *Afzeliella*, belongs to the Osbeckiæ, and is founded on *Guyonia ciliata* Hook. fil. Its nearest ally is *Guyonia*, from which it differs in having tetramerous flowers, a hairy receptacle and eight instead of ten equal stamens; but it must be remembered that neither Sir J. Hooker nor Prof. Cogniaux considered this a sufficient distinction on which to found a new genus. Again, *Urotheca* and *Petalonema* are interesting as being the only African members of the *Oxysporeæ*, the connective in both being produced below into a spur, but we doubt whether the distinction alleged between the two is of generic importance. *Cincinnobotrys*, an epiphyte, belongs to the *Sonerileæ*, the flowers are cymose and tetramerous. The remaining new genera belong to the *Dissochætæ*, which tribe may be divided into two divisions, according as the stamens are dissimilar or similar (or nearly alike): *Myrianthemum*, with a cluster of numerous flowers, belonging to the former division, and *Tetraphyllaster*, *Phæoneuron*, *Preussiella*, and *Orthogoneuron* to the latter. The largest genus, *Dissotis*, affords again good illustration of the mass of material which has been acquired during the last twenty-five years, Dr. Gilg having fifty-one species, Prof. Cogniaux thirty-two, while in the *Flora of Tropical Africa* (1871) there are only twenty. We regret that the monographer did not consult the herbaria in this country, as additional information would certainly have been acquired, and points still left in doubt might have been settled. For example, Triana, in his revision of this order, gives the distribution of *Otanthera cyanoides* as Moluccas and Sierra Leone (Afzelius). The Afzelian specimen, with Dr. Triana's identification, is in the National Herbarium, and, if correctly named, introduces a Malayan genus to the African Flora. It is not in flower or fruit, and we are inclined to think that it is probably referable to some known African species, possibly *Osbeckia multiflora* Sm.—E. G. B.

Mr. V. H. Blackman, of the Department of Botany, British Museum, has been elected Fellow of St. John's College, Cambridge.

The *Flora des Nordostdeutschen Flachlandes* (Berlin: Borntraeger), by Prof. Ascherson and Dr. P. Graebner, of which three parts have just appeared, is extremely carefully done; the notes, both descriptive and geographical, being very full. We hope to say more of it when it is completed; meanwhile we would direct the attention of British botanists to the book, which is commendable on account of its cheapness, as well as on other grounds; each part consists of 160 pages, and costs only one mark. The type, though small, is extremely clear, and the treatment of such critical genera as *Salix* and *Carex* is careful and elaborate. One curious omission strikes us: no authority is appended either to the generic or to the specific names. The editors have secured the collaboration of various German botanists.

We have received from the same publishers a pretty and compact *Botaniker Kalender* for 1899, edited by Prof. Sydow. Besides the diary proper, which gives for each day the names and dates of such botanists as were born or have died upon it, there are various appendixes, containing the Berlin rules for nomenclature, a list of cryptogamic exsiccata, with dates; a list of the various botanic gardens, with names of their officers; and an extremely useful and carefully done list of the principal collections of plants, arranged alphabetically under the names of the collectors, with indication of where they may be found. This is very comprehensive, and might well be issued separately for distribution. Looking through it, we note extremely few inaccuracies; here and there, however, a statement needs correction—"H. M. Ridley" and "Hn. Ridley," for example, are one and the same person, and neither of these is his correct name; moreover, his Fernando Noronha plants are primarily at the British Museum, not at Kew: the two Massons are also identical. But it is an excellent list, and the little volume, which costs only 3 marks, is worth obtaining on its account alone.

Messrs. Linton have sent out the fourth fascicle of their Set of British Hieracia. This surpasses each of its predecessors in the number of endemic forms it contains, there being sixteen in all, *viz.* eleven species and five varieties. These are:—*H. gracilentum*; *H. nigrescens*, var. *gracilifolium*; *H. cerinthiforme*; *H. flocculosum*; *H. Lima*; *H. carenorum*; *H. Schmidtii*, var. *devoniense*; *H. caledonicum*; *H. nitidum*; *H. Pictorum*; *H. pollinarium*; *H. pollinarium*, var. *platyphyllum*; *H. rubiginosum*; *H. cambricum*; *H. Orarium*, var. *fulvum*; *H. rigidum*, var. *serpentinum*.

At the meeting of the Linnean Society on Nov. 3rd, Prof. H. Marshall Ward read a joint paper by Miss Dale and himself on *Craterostigma pumilum*, which had been brought from Somaliland by Mrs. Lort Phillips. As it had flowered in the Cambridge Botanic Garden during the past summer, and ripe capsules and seeds were obtained, a complete description was possible. The authors have examined the anatomy of the plant in detail, and they record some interesting points concerning the red colouring-matter of the roots, which occurs as amorphous red granules on the cell-walls, and lining the large intercellular space of the cortex. Its reactions are unlike those of any other pigment with which the authors have compared it: it is not carotin, and cannot be explained as a reserve-material or as a colour-screen, and they regard it as an excretion. That portion of the paper which dealt with the systematic position of *Craterostigma* showed that the authors were not on familiar ground; and Prof. Ward's naïve account of the steps which he took to ascertain this position caused some amusement to systematists who were present.

We have so often felt it necessary to call attention to the irregularity of the issue of the Kew *Bulletin* that it is only fair that we should note that the much-needed reform in this matter has taken place—whether on account of our remonstrances we do not know, nor is it needful to enquire. The November number contains a further instalment of the "Diagnoses Africanæ," in which we note a correction of certain previously-published names which prove to be synonyms: the *Bulletin* has done a good deal in this way of encumbering nomenclature. A new *Ceropegia* from Welwitsch's collections is described; we think it would have been courteous to have left this to Mr. Hiern, a further instalment of whose Catalogue of Welwitsch's African collections will be published this month. It will bring the enumeration down to the end of *Scrophulariaceæ*.

A good example of "a botanical reader for children" will be found in Mrs. Alice Merritt Davidson's *California Plants in their Homes* (Los Angeles: Baumgardt & Co., 1898; 8vo, pp. 216), with which is bound a "supplement for the use of teachers," extending to 133 pages. It is somewhat in the style of Asa Gray's *How Plants Grow*, but is more comprehensive, and is written in a simple style which children can readily follow and understand. The headings of the chapters are sometimes rather quaint—"Plants that know how to meet hard times," "Plants with mechanical genius," and the like; but they deal clearly and brightly with the principal phenomena of growth, structure, fertilization, and the like. There are numerous figures, but these are neither well drawn nor satisfactorily reproduced. The Supplement contains practical suggestions, and based on the author's own experience as a teacher in a "state normal school," which are likely to be useful to those similarly situated. The two parts bound in cloth cost $1.50.

The last part of the *Transactions* of the Perthshire Society of Natural Science (vol. ii. part 6) contains several papers of botanical interest: among them Mr. R. H. Meldrum's 'Preliminary List of Perthshire Mosses,' Mr. R. Smith's 'Plant Associations of the Tay basin,' and Mr. P. McNair's essay on "The Geological Factors in the Distribution of the Alpine Plants of Perthshire." We are glad to note that the parts of these well-printed and carefully edited *Transactions*, which are published at the Natural History Museum in Perth, may be obtained by non-members at very reasonable cost: the present instalment costs 1s. 6d.

The continued and increasing demands on our space, although gratifying evidence of the usefulness of the Journal and of its recognized value as a channel of publication, compel us to defer several reviews of important works. Among these may be mentioned the new edition of the 'Cybele Hibernica'; Dr. Schwendener's 'Gesammelte Botanische Mittheilungen'; Mr. H. C. Hart's 'Flora of Donegal'; the first part of Dr. Urban's 'Symbolæ Antillanæ'; the concluding volume of Dr. Britton's 'Illustrated Flora of North America'; and Dr. A. F. W. Schimper's 'Pflanzen-Geographie.' We have also, for the same reason, been compelled to postpone any extracts from the recent reports of the Botanical Exchange Club, and to defer the completion of the 'Biographical Index'; this we hope to finish in the January number, and to reissue in pamphlet form early in 1899. Several papers, some of them relating to British botany and others of bibliographical interest, also stand over. Many of the foregoing will be printed in our next issue.

ERRATA.

P. 28, l. 13 from bottom, for "endocarpis" read "endocarpio."
P. 65, l. 15 from top, for "Phoraceæ" read "Thoraceæ."
P. 188, l. 5 from bottom, for "compressis" read "compressus."
P. 189, l. 2 from top, for "cm." read "mm."
P. 208, ll. 7 and 8 from bottom, for "Perry" read "Penny."
P. 267, l. 16 from bottom, for "Down" read "Antrim."
P. 285, l. 13 from bottom, for "Wallace" read "Wallich."
P. 298, l. 2 from bottom, and p. 299, l. 9 from top, for "1737" read "1753."
P. 331, l. 7 from top, for "probably a species of *Desmagonium*" read "*Actinella punctata* Lewis."
P. 333, l. 5 from bottom, for "*pyramidatum*" read "*subpyramidatum*."
P. 336, l. 16 from bottom, for "tenacity" read "tenuity"; l. 2 from bottom, for "sanguineum" read "sanguineo."
P. 380, l. 13 from top, for "*Salix*" read "*Salvia*."
P. 461, l. 16 from top, for "Watts" read "Ivatts."

INDEX.

For Classified Articles, see—Articles in Journals; County Records; Obituary; Reviews. New genera, species, and varieties published in this volume, as well as new names, are distinguished by an asterisk.

Abbreviation, an insufficient, 353
Acanthoscyphus, 110
Acidanthera Gunnisi,* 31
Adenandra Bodkinii,* 315
Adenogonum* decumbens* (t. 389), 290
Æcidium Diospyri,* 178
Æsculus, M. Christy on, 359
African Botany (rev.), 232, 461
Agathosma alpina,* 25
Aitchison, J. E. T., 463
Algæ, Freshwater, 330; Literature of, 64, 195, 227, 275, 402, 447
Alsine, 496
Anemopægma carrerense,* 188
Antennaria plantaginea, 266
Archevalata's 'Flora Uruguaya,' 285
Arctium nemorosum, 493
Arctophila fulva, 432
Arcyria, 121
Arenaria, 156; serpyllifolia, 351; uliginosa, 189
Armitage, E., Anemopægma carrerense,* 180
Arthrodesmus, 335
Articles in Journals:—
  Annals of Botany, 40, 69, 154, 283, 406, 408
  Ann. Scott. Nat. Hist., 110, 235, 407
  Ann. Sciences Nat., 158
  Bot. Centralblatt, 69, 110, 154, 235, 283, 326, 357, 407, 459, 500
  Bot. Gazette, 69, 110, 155, 236, 283, 357, 460, 500
  Bot. Notiser, 70, 110, 283, 500
  Bot. Zeitung, 70, 110, 236, 283, 358, 460
  Bull. de l'Herb. Boissier, 70, 110, 155, 236, 283, 327, 358, 407, 460, 500
  Bulletin of Miscell. Information, 112, 239, 284, 287, 328, 503
  Bull. Soc. Bot. Belgique, 358
  Bull. Soc. Bot. France, 70, 283, 327, 358
  Bull. Torrey Bot. Club, 70, 110, 111, 155, 236, 284, 358, 407, 500
  Erythea, 70, 155, 236, 327, 358, 407, 460, 500
  Gard. Chronicle, 70, 110, 155, 236, 284, 327, 358, 407, 460
  Journ. de Botanique, 70, 110, 155, 158, 236, 284, 358, 407, 460, 500
  Journ. Linn. Soc., 71, 158, 237, 501
  Journ. Royal Microscopical Soc., 111
  Malpighia, 237, 460
  Naturalist, 42
  Nuov. Giorn. Bot. Ital., 110, 237, 358
  Oesterr. Bot. Zeitschrift, 71, 111, 155, 237, 284, 327, 358, 407, 460, 501
  Trans. Linn. Soc., 71
  Trans. Nat. Hist. Soc. Glasgow, 40
Arum maculatum, 408
Asarum macranthum, 98; Shuttleworthii, 98; virginicum, 97
Asclepiadaceæ, Revision of S. African, 475
Asclepias amplexicaulis, 298; verticillata, 264
Ascochyta Spondiacearum,* 178; Tiliacoræ,* 178
Ascherson's 'Flora des Nordostdeutschen Flachlandes,' 502

Babington, Memorials of (rev.), 33
Baccharis arborea, 55
Badhamia, 113, 116
Bagnall, J. E., Merionethshire Mosses, 217
Bailey's (L. H.) 'Plant-Breeding' and 'Lessons on Plants' (rev.), 199; 'Garden-Making' (rev.), 326
Baker, E. G., Somali-land Polypetalæ, 2; 'Le Fumariacee Italiane' (rev.), 66; Notes on Asarum, 96; Viola palmata, 129; Heliocarpus americana, 130; Tilia cordata, 318; Arenaria serpyllifolia,

351; Niedenzu's Bunchosia (rev.), 356; new Crassulas, 361
Barton, E. S., Algological Literature, 195, 227, 275, 402; 'Die nat. Pflanzenfamilien; Algæ' (rev.), 64; Soranthera, 238; Development of Florideæ, 447
Bees and Flowers, 40
Benbow, J., Bucks plants, 492
Bennett, A., Carex frigida, 103; Shropshire Plants, 380; Elatine Hydropiper, 440; Melampyrum cristatum, 441; I. of Man plants, 441
Berardia trigyna,* 315; velutina,* 257
Bibliographical Notes, 264, 274, 320, 397, 441
Bicheno's Herbarium, 275
Biographical Index of Botanists, 99, 145, 192, 267, 443
Blackman on Phytoplankton, 239
Blepharonema, 155
Bley's 'Botanisches Bilderbuch,' 40
Botrychium australe, 479; matricariæfolium and B. lanceolatum (t. 388), 291
Botrytis angularis,* 181
Boulger, G. S., Biographical Index of Botanists, 99, 145, 192, 267, 443
Braithwaite's Moss-flora, 155
Brenan, S. A., Plantago media, 351
British Botanists, Index of, 99, 145, 193, 267; Carices, 41, 73, 103; Characeæ, 182, 409; Flora, a New, 94; Fungi, 180, 226, 438; Willows, set of, 72; Mosses, Distribution of, 60, 133, 184, 217, 261, 302
Britten, J., Memorials of Babington (rev.), 33; Royal Gardens, Kew (rev.), 35; Miller's Conyzas, 51; The Fifty Years' Limit in Nomenclature, 90; a new British Flora, 94; Notes on Asarum, 96; Biographical Index of Botanists, 99, 145, 192, 267, 443; 'Flora of Berkshire' (rev.), 104, 225, 349; Note on Fragaria, 125, 225; African Botany (rev.), 232; Nomenclature of Senecios, 259; Gronovius' 'Flora Virginica,' 264; Smith's Georgian Plants, 297; Flora of Perthshire (rev.), 321; Bibliographical Notes, 274, 320, 397; An insufficient Abbreviation, 353; Fryer's Potamogetons (rev.), 353; Dedication of Jacksonia, 399; Notes on Hoya, 413; Habenaria viridis var. bracteata, 437; T. Kirk, 489; Botrychium australe, 491
Bromley, Flora of, 160
Bromus interruptus, 274, 319
Brown's Californian Plants, 38
Bruce, G. L., Veronica polita, 227
Bubani's Flora Pyrenæa (rev.), 150
Bulbine flexuosa,* 27
Bulbophyllum flammuliferum,* 211
Bullock-Webster, G. B., Characeæ Records, 182
Bunchosia, 356

Cactaceæ, Orcutt's, 71
Cactus Journal, 159
Calamagrostis neglecta, 431
Calanthe gigantea, 214
Calothrix balearica var. tenuis,* 337
Campbell on Soranthera, 237
Carex frigida (t. 382), 41, 103; chordorhiza (t. 383), 73; British species of, 73; helvola, 157; Scottish species, 176; pulicaris, 399; Sadleri, 442; stricta, 274
Carruthers (J. B.) on Cocoa disease, 286
Carruthers, W., Seward's 'Fossil Plants' (rev.), 277; Frank's 'Agricultural Botany' (rev.), 282
Catharinea Haussknechtii, 62; tenella, 320, 465 (t. 393)
Cerastium, primary characters in, 8; critical notes on, 341, 382; africanum vars.,* 342; arvense var. ambiguum,* 382; arcticum, 440, 493
Channel Islands, Rubi and Rosæ of, 85
Chara aspera subsp. desmacantha* (t. 391), 410
Characeæ Records, 182 (tt. 391, 392), 409; Migula on (rev.), 280
Chenopodium glomerulosum, 149
Chilionema, 232
Christie, A. C., Lonicera Caprifolium, 275; Perthshire Note, 319
Christy, M., on Æsculus, 359
Cirrhopetalum ochraceum,* 212
Cladostomum, 110
Clark, J. A., 313; Thomas, 311
Clematis rosea, 302
Climatic Zones, Watson's, 82
Clonothrix gracillima,* 337
Closterium. 332
Cocoa disease, 286
Conyzas of Mill. Gard. Dict., 51; Baccharis, 51; corymbosa, 51;

pedunculata, 52; salicifolius, 52; scandens, 52; spicata, 52; symphytifolia, 53; tomentosus, 53; trinervius, 53; uniflora, 53; viscosa, 53
Corbaderia, 70
Cosmarium, 333; Heimerlii var. tumidum,* 334
Costantin's 'Les Végtéaux' (rev.), 206
COUNTY RECORDS:—
  Anglesey, 19, 77, 440
  Bedford, 161–5, 399
  Berks, 104, 125, 222, 274, 348, 355
  Brecon, 7
  Bucks, 224, 319, 492
  Cambridge, 182–4, 246, 328, 353, 400
  Cardigan, 21
  Carmarthen, 22
  Carvarvon, 19, 440
  Chester, 32, 62, 81, 112, 302, 321, 401, 503
  Cornwall, 62, 351
  Denbigh, 20, 187
  Derby, 124
  Devon, 45, 62, 63, 127, 351
  Dorset, 63, 275, 351
  Essex, 185
  Flint, 20
  Glamorgan, 22
  Gloucester, 32, 209, 402
  Hants, 32, 124, 208, 261, 274, 320, 441
  Hereford, 7
  Herts, 227, 321
  Isle of Man, 441
  Kent, 63, 75, 158, 160, 319, 320, 351, 462
  Lancaster, 32, 133, 321, 401
  Leicester, 149
  Lincoln, 55, 112
  Merioneth, 20, 217, 227
  Middlesex, 111, 319
  Monmouth, 7, 22, 32, 180, 181, 187, 402
  Montgomery, 21
  Norfolk, 125, 182
  Oxford, 224, 275, 348
  Pembroke, 22, 188, 275
  Radnor, 21
  Salop, 380
  Somerset, 32, 63, 149, 162, 311
  Stafford, 440
  Suffolk, 182
  Surrey, 63, 75, 76, 103, 111, 125, 164, 275, 399, 400, 440
  Sussex, 181, 351
  Worcester, 40, 76, 440
  Yorks, 238, 272, 300–37
  See also 'Notes on British Characeæ,' 409–13
Cousins' 'Chemistry of the Garden,' 208
Crassula anomala,* 370; aphylla,* 371; confusa,* 366; cyclophylla,* 363; Dodii,* 372; Flanagani,* 362; hirsuta,* 365; hispida,* 368; inandensis,* 364; Lambertiana,* 371; latispathulata,* 364; leucantha,* 369; Macowaniana,* 361; multiflora,* 368; namaquensis,* 367; oblanceolata,* 365; pachystema,* 367; pallens,* 361; papillosa, 371; punctulata,* 362; Promontorii,* 3[illegible]6; rubescens,* 363; Rudolfi,* 363; scalaris,* 369; subacaulis,* 370
Craterostigma, 503
Cross-fertilization of Salices, 122
Crouch, C., Carex pulicaris, 399
Curtis's 'Textbook' (rev.), 458
'Cybele Hibernica,' new edition, 72
Cycadaceæ, Anatomy of, 156
Cymbidium Leai,* 221; Sparkesii,* 221

Dactylococcopsis montana,* 337
Dactylococcus bicaudatus var. subramosum,* 335
Dates of periodicals, 258
Davidson's 'California Plants,' 503
Deas' 'Flower Favourites,' 287
Dendrobium modestum,* 211
Dendroceros, Structure of, 237
Dendrocolla carnosa,* 216
Detmer's 'Plant Physiology' (rev.), 324
Dewevrea, 358
Dianthus deltoides, 274; gallicus, 493
Dichæa bulbillosa, 165
Didymium Trochus,* 164
Dixon, H. N., County lists of Mosses, 184, 261; Plagiothecium Mülleri-anum (t. 387), 241
Docidium costatum, 333
Dod, A. H. W., Gymnadenia conopsea × albida, 352
Dothidella Graphis,* 179; Welwitschii,* 179
Druce, G. C., Helleborus occidentalis, 222; Fragaria muricata, 225; Poa flexuosa, 227; Dianthus deltoides, 274; Bicheno's Herbarium, 275; Bromus interruptus, 319; Berkshire Varieties, 275,

348; his 'Flora of Berkshire' (rev.), 104
Dunn, S. T., Taraxacum lævigatum, 32; Plantago Forms, 62; Mentha notes, 63; Sinapis orientalis, 103; Wandsworth Aliens, 103

Earle's (Mrs.) 'Potpourri from a Surrey Garden,' 158
Elatine Hydropiper, 400, 440
Engler's 'Syllabus' (rev.), 404; African Monographs, 501
Eria cymbidiifolia,* 212; hispidissima,* 213; pensilis,* 213; sumatrensis,* 212
Eriospermum patentiflorum,* 27;
Erodium, hygrometer made with, 62
Euastrum, 333
Euphorbia prostrata, 32
Euphrasia canadensis* (t. 381), 1; foulaensis, 150; latifolia, 274; Scottish species, 174
Euryops montana,* 316
Exosporium celatum, 179
Eyre, W. L. W., Hants Mosses, 320

Fabricius' 'Enumeratio,' 397
Farmer, J. B., Curtis's 'Textbook' (rev.), 458
Feilden, H. W., Flowering Plants of Novaya Zemlya, 358, 418, 468
Felicia amelloides,* 26, 374
Ficalhoa laurifolia,* (t. 390), 329
Florideæ, Fertilization of, 447
Forcipella 236
Fossombronia Mittenii* (t. 382), 44
Fragaria bercheriensis, 125; moschata, 129, 226; muricata, 127, 225
Frank's 'Agricultural Botany' (rev.), 282
Fryer's Potamogetons (rev.), 354
Fungi, Welwitsch's African, 177; British, 180

Galium Vaillantii, 275
Gautier's 'Flore des Pyrénées-Orientales,' 111
Gilg's African Melastomaceæ, 501
Gepp, A., Kindberg's European Bryineæ (rev.), 37; Paris' 'Index Bryologicus,' 463
Giraud's 'Aide-mémoire' (rev.), 282
Glycine elliptica, 298
Goldney's 'Guide to Kew Gardens' (rev.), 35, 281
Gonatozygon sexspiniferum, 330
Goode, G., Cambridgeshire Plants, 400
Gronovius' 'Flora Virginica,' 264
Groom's 'Elementary Botany' (rev.), 153
Groves, H. & J., Migula's Characeæ (rev.), 280; Notes on British Characeæ, 409
Gymnadenia conopsea × albida, 352
Gymnatocarpus, 72

Habenaria viridis var. bracteata, 437
Hamilton, W. P., Sphagnum Austini, 320
Handley's Sedbergh List, 238
Hebenstreitia macrophylla,* 317
Hecatonema, 231
Heliocarpus americana, 130
Heliophila Dodii,* 314; scabrida,* 314
Helleborus occidentalis, 222
Hemimeris gracilis,* 375
Hepaticæ, Scottish, 340
Hermannia asbestina,* 373
Hexagonia Welwitschii,* 177
Hieracium hypochœroides var. Cyathis,* 6; pollinarium var. platyphyllum,* 7; Scottish species, 171; Linton's set of, 503
Hiern, W. P., Bubani's Flora Pyrenæa (rev.), 150; Murbeck's Flore de la Tunisie (rev.), 204; New Genera of Compositæ (tt. 338–9), 289; Veronica Anagallis, 321; Ficalhoa,* (t. 390), 329; Kuntze's 'Revisio' (rev.), 494
Holtermann's 'Mykologische Untersuchungen' (rev.), 454
Hooker (J. D.) Medal, 487; his 'Flora of British India,' 39
Hörmann's 'Protoplasmastromun bei den Characeen' (rev.), 453
Hormospora ordinata,* 330
Horrell, E. C., British Mosses, 60; Leucobryum glaucum, 227
Hoya, notes on, 413; acuta, 413; Aldrichii, 417; australis, 414; crassifolia, 416; Cunninghami, 417; nicobarica, 414; pendula, 415; pilosa, 417; purpurascens, 417; Wightii, 416
Hughes-Gibb's 'Making of a Daisy' (rev.), 325
Hygrometer made with Erodium, 62

Iberis amara var. ruficaulis, 348
'Icones Bogorienses,' 72
India, Flora of British, 39
Indovethia, 72
Irish Plants, 46, 72, 80, 201, 351, 352, 400, 409–12, 442

Jackson, A. B., Tortula intermedia, 149; Bromus interruptus, 274; Carex stricta, 274; Lathyrus Aphaca, 353
Jackson, B. D., Bibliographical Note, 441
Jacksonia, 399
Jatropha Phillipsiæ,* 30
Jungermania obtusa, 493

Kelleronia Gillettii,* 6
Kew Bulletin, 112, 239, 284, 287, 328, 503; Gardens, 460 (rev.), 35, 281; opening of, 238, 464
Kindberg's 'Bryineæ' (rev.), 37
King's Sikkim Orchids, 498
Kirchneriella obesa var. pygmæa,* 336
Kirk, Thomas, 489
Kränzlin's 'Orchidacearum Genera' (rev.), 451
Kuntze's 'Revisio,' 464 (rev.), 493

Laboratory Practice (rev.), 36
Lathyrus Aphaca, 353, 400
Leucobryum glaucum, 227
Ley, A., new forms of Hieracium, 6
Limnocarpus, 208, 327, 360
Linnean Society, 156, 157, 208, 237, 238, 285, 359, 360
Linton, E. F., Carex frigida (t. 382), 41; Experiments in Cross-fertilization, 122; Galium Vaillantii, 275
Linton's Set of British Willows, 72; of Hieracia, 503
Liparis pectinifera,* 210
Lister, A., Mycetozoa of Antigua and Dominica, 113 (t. 385), 378; Notes on Mycetozoa, 161 (t. 386)
Lister, G., Elatine Hydropiper, 400
Lonicera Caprifolium, 275
Lophocolea spicata, 401
Loranthus Pentheri,* 376
Lortia,* 29; erubescens,* 30
Lotononis macra,* 373
Lowe's 'Yew-trees,' 408
Macvicar, S. M., Watson's Climatic Zones, 82; Mastigophora Woodsii, 103
Malayan Orchids, 210
Malva moschata var. Ramondiana, 349
Marquand's 'Fungi of Guernsey,' 287
Marshall, E. S., Wexford Plants, 46; British Sedges (t. 383), 73; Ranunculus petiolaris, 103; Euphrasia foulaensis, 150; E. latifolia, 274; Scottish Plants, 66; Ophys apifera × aranifera, 319; Cerastium arcticum, 440
Mastigophora Woodsii, 103
Mathiola dimolehensis,* 2
Melampyrum cristatum, 441
Melhania Phillipsiæ,* 4; somalensis,* 3
Melvill, J. C., Sisymbrium strictissimum, 32
Mentha notes, 63
Meschinelli's 'Iconographia Fungorum Fossilium' (rev.), 459
Mesembryanthemum nubigenum,* 316
Mesotænium purpureum,* 332
Microthyrium Millettiæ,* 179
Migula's Characeæ (rev.), 280
Mimosa microphylla, 301
Missouri Bot. Garden Report, 112
Mönkemeyer's 'Die Sumpfplanzen' (rev.), 68
Montemartini's Fisiologia vegetale (rev.), 207
Moore, Spencer, 'Palmæ Mattogrossenses' (rev.), 355; 'Protoplasmaströmung bei den Characeen' (rev.), 453
More, A. G., Life of (rev.), 201
Moræa macra,* 377; Randii,* 144
Morris, D., leaving Kew, 359
Mortierella Bainieri var. Jenkini,* 180; repens,* 180
Mosses, British, 60; S. Lancashire, 133; N. Essex, 185; Denbighshire, 186; Monmouth, 187; Pembrokeshire, 188; Merionethshire, 217; Hants, 261, 320; Cheshire, 302
Murbeck's Flore de la Tunisie (rev.), 204
Murray (N. G.) on Phyto-plankton, 239; Holtermann's 'Mykologische Untersuchungen' (rev.), 454; 'Monographie des Caulerpes' (rev.), 455; 'Iconographia Fungorum Fossilium' (rev.), 459
Mycetozoa of Antigua and Dominica, 113 (t. 385), 378; Notes on, 161 (t. 386)

Nicotra's 'Fumariacee Italiane' (rev.), 66
Niedenzu's Bunchosia (rev.), 356
Nitella hyalina (t. 392), 411
Nomenclature, Fifty Years' Limit in, 90
Novaya Zemlya, Plants of, 388, 418, 468

Oberonia aurantiaca,* 210
OBITUARY :—
  Aitchison, J. E. T., 463
  Kirk, Thomas, 489
  Lange, Johan M. C., 288
  Montrouzier, Xavier, 288
  Penny, C. W., 208
Odontelytrum, 155
Oltmanns on Florideæ (rev.), 447
Oocystis parva,* 335
Ophrys apifera × aranifera, 319
Orchids, Malayan, 210; Sikkim, 498
Orcutt's Cactaceæ, 71
Othonna patula,* 26
Oxalis gracilipes,* 23; Leipoldtii,* 24

'Palmæ Mattogrossenses' (rev.), 355
Paris's 'Index Bryologicus,' 462
Peacock, E. A. W., Flora of Lincolnshire, 55
Pearson, W. H., Scottish Hepaticæ, 340; Lophocolea spicata, 401; Scalia Hookeri, 441; Jungermania obtusa, 493
Penium cuticulare, 332
Penny, C. W., 208
Pentanopsis,* 28; fragrans,* 29
Phyllachora irregularis, 179; minutissima, 179; repens, 178
Phyllanthodendron, 238
Phyllophora, 228
Phyllosticta Tricalysieæ,* 178
Physarum, 113; Berkeleyi, 114; bogoriense, 122; didermoides var. lividum,* 161; murinum β æneum,* 117; nucleatum, 378; nutans var. leucophæum, 116; pallidum, 117; straminipes,* 163; variabile, 113; vernum, 165
Phyto-plankton, 239
Plagiothecium Müllerianum (t. 387), 241
Plantago forms, 62, 321; media, 351, 400
Pleurococcus rufescens var. sanguineus,* 336
Pleuropogon Sabinii, 431
Pleurotænium annulatum, 332
Pluchea odorata, 54
Poa flexuosa, 227; palustris, 324
Polygala Dodii,* 24
Polyporus umbellatus, 399
Potamogetons, British (rev.), 354
Poulsenia, 69
Praeger, R. Ll., Plantago media, 400
Pretrea, 345
Prosthecidiscus, 236
Psednotrichia* tenella* (t. 388), 289
Pseudorlaya, 205

Queensland Cymbidiums, 221
Quercus ambigua, 300; lobulata, 299

Rand, R. F., Wayfaring Notes in Rhodesia, 141, 345
Ranunculus scoticus,* 103
Rendle, A. B., New Somali-land Plants, 28; Setchell's Laboratory Practice (rev.), 36; Darwin and after Darwin (rev.), 67; 'Die Sumpf- und Wasserpflanzen' (rev.) 68; Groom's 'Elementary Botany' (rev.), 153; Bailey's 'Plant-breeding' and 'Lessons' (rev.), 199; Costantin's 'Les Végétaux' (rev.), 206; Tognini's 'Anatomia' (rev.), 207; Montemartini's 'Fisiologia' (rev.), 207; Queensland Cymbidiums, 221; 'Text-book of Botany' (rev.), 278; Girard's 'Aide-mémoire' (rev.), 282; Detmer's 'Plant Physiology' (rev.), 324; 'Lehrbuch der Botanik' (rev.), 325; 'Making of a Daisy' (rev.), 325; Engler's 'Syllabus' (rev.), 404; Kränzlin's Orchideæ (rev.), 451; Van Tieghem's 'Eléments' (rev.), 456
REVIEWS:—
  Memorials of Babington, 33
  Laboratory Practice. W. A. Setchell, 36
  Kew Gardens. Mrs. S. Goldney, 35, 281
  Bryineæ. N. C. Kindberg, 37
  Die Nat. Pflanzenfamilien: Algæ, 64
  Le Fumariacee Italiane. L. Nicotra, 66
  Darwin and after Darwin. G. J. Romanes, 67
  Die Sumpf- und Wasserpflanzen. W. Mönkemeyer, 68
  Flora of Berkshire. G. C. Druce, 104
  Flora Pyrenæa. P. Bubani, 150
  Elementary Botany. P. Groom, 153
  Plant-breeding and Lessons. L. H. Bailey, 199
  Life of A. G. More, 201
  Flore de la Tunisie. S. Murbeck, 204

Les Végétaux. J. Costantin, 206
Anatomia vegetale. F. Tognini, 207
Fisiologia vegetale. L. Montemartini, 207
Welwitsch's African Plants. W. P. Hiern, 234
Flora of Tropical Africa, 233
Flora Capensis, 234
Fossil Plants. A. C. Seward, 277
Text-book of Botany. E. Strasburger, &c., 278, 325
Characeæ. W. Migula, 280
Agricultural Botany. A. B. Frank, 282
Aide-mémoire. H. Girard, 282
Flora of Perthshire. F. B. W. White, 321
Plant Physiology. W. Detmer, 324
Making of a Daisy. E. Hughes-Gibb, 325
Garden Making. L. H. Bailey, 326
British Potamogetons. Fryer, 354
Palmæ Mattogrossenses. J. B. Rodrigues, 355
Bunchosia. F. Niedenzu, 356
Syllabus der Pflanzenfamilien. A. Engler, 404
Orchidacearum Genera. F. Kränzlin, 451
Protoplasmaströmung bei den Characeen. G. Hörmann, 453
Mykologische Untersuchungen. C. Holtermann, 454
Caulerpes. Weber van Bosse, 455
Eléments de Botanique. P. van Tieghem, 456
Text-book of Botany. C. C. Curtis, 458
Fungorum Fossilium Iconographia. A. Meschinelli, 459
Revisio Generum. O. Kuntze, 494
Orchids of Sikkim-Himalaya, G. King and R. Pantling, 498
Rhapidium polymorphum var. spirale,* 335
Rhopalandria, 328
Rhodesia, Wayfaring notes in, 141, 345
Ridley, H. N., New Malayan Orchids, 210
Robinson's 'English Flower-garden,' 408
Rochebrune's 'Toxicologie Africaine,' 112
Rodrigues' 'Palmæ Mattogrossenses,' (rev.), 355
Rogers, W. M. & F. A., 'Rubi and Rosæ of Channel Islands', 85
Rolfea,* 493
Romanes' 'Darwin and after Darwin' (rev.), 67
Romulea longipes,* 377; Thodei,* 318
Rosæ of Channel Islands, 90
Rowan's (Mrs.) 'Flower-hunter in Queensland,' 159
Rubi of Channel Islands, 85; Scottish, 338, 339; Lancashire, 401
Rumex angiocarpus, 352

Saccardo's 'Index Fungorum,' 239
Saccolabium Angræcum,* 214; cortinatum,* 215; secundiflorum,* 215
Salices, Cross-fertilization of, 122
Salmon, C. E., Notes from Cantire, 318
Salmon, E. S., Catharinea tenella, 320, 465 (t. 393); on Symblepharis, 285
Salmonia Polygonatum,* 399
Scalia Hookeri, 441
Scargill's Flora of Bromley, 160
Scenedesmus spicatus,* 335
Schlechter, R., Decades Plantarum Novarum Austro-Africanarum, 23, 314, 373; Revision of S. African Asclepiadaceæ, 475
Schonland, S., New Crassulas, 361
Schrankia, 301
Scottish Plants, 40, 41, 72, 73–82, 103, 110, 166, 180, 227, 235, 274, 275, 291, 319, 321, 338, 340, 343, 401, 407, 440, 441, 442, 504
Senecio, nomenclature of, 259; confusus,* 260; Hemsleyi,* 260; subcoriaceus,* 375
Sepedonium sepedonioides, 181
Setchell's 'Laboratory Practice' (rev.), 36
Seward's Fossil Plants (rev.), 277
Shoolbred, W. A., W. Gloucester and Monmouth Plants, 32, 402; Scottish Plants, 166; Carex Sadleri, 442
Sinapis orientalis, 103
Sisymbrium strictissimum, 32
Sisyrinchium angustifolium, 442
Smith's Georgian Plants, 297
Smith, A. L., Underwood's Alabama Fungi, 71; Welwitsch's Fungi, 177; British Fungi, 180

Smith, W. G., Basidiomycetes new to Britain, 226
Somali-land plants, 3, 28
Somerville's 'County Divisions,' 286
Soranthera, 238
Souliea, 237
Spergularia, 496
Spermacoce hyssopifolia, 299
Sphagnum Austini, 320
Spirotænia fusiformis,* 331; minuta var. eboracensis,* 226, 331; turfosa,* 331
Spondylosium, 334
Stachys alpina (t. 384), 209; lasiocalyx,* 317
Staurastrum, 334
Stipitococcus* urceolatus,* 336
Stokes, William, 360
Strasburger's 'Textbook of Botany' (rev.),278, 325
Stratton, F., Life of A. G. More (rev.), 201
Strawberry, the Plymouth, 127
Swan, L. M., Sisyrinchium angustifolium, 442
Swanton, E. W., Polyporus umbellatus, 399
Sydow's 'Botaniker Kalender,' 502
Symblepharis, 285

Taraxacum lævigatum, 32
Tetraedron floridense,* 336
Thesium polyanthum,* 27; Sanderianum,* 376
Thompson, H. S., Thomas Clark and Somerset Plants, 311
Tilia cordata, 318; Maximowiczii, 319
Tindall, E. M., Fossombronia Mittenii (t. 382), 44
Tissa, 496
Tognini's 'Anatomia Vegetale'(rev.), 207
Tortula intermedia, 149
Towndrow, R. F., Pembroke Records, 275; Arctium nemorosum, 493
Townsend, F., Euphrasia canadensis (t. 381), 1
Trifolium Molinerii, 351
Trimen, Dr., memorial to, 160

Umbilicaria linifolia,* 398; Omphalodes,* 398
Underwood's Alabama Fungi, 71

Vailia, 407
Van Tieghem's 'Eléments' (rev.), 456
Vernonia collina,* 374
Veronica Anagallis, 321; polita 227
Vickersia, 227
Viola palmata, 129

Wales, Flora of, 10; altitudes in, 82
Ward, James, 271
Watson's Climatic Zones, 82
Weathers, J., Bailey's 'Garden Making' (rev.), 326
Weber van Bosse's 'Caulerpes' (rev.), 455
Welwitsch's African Fungi, 177; Plants (rev.), 234, 289
West, W. & G. S., Freshwater Algæ, 111, 330
West, W., Jun., Cambridge Plants, 246, 328, 491; Trifolium Molinerii, 351; Elatine Hydropiper, 440
Wexford plants, 403
Wheldon, J. A., Catharinea Hausknechtii, 62; S. Lancashire Mosses, 133; Cheshire Mosses, 302; Plantago ceratophyllum, 321; Lancashire & Cheshire Rubi, 402
White's (F. B.) 'Flora of Perthshire' (rev.), 321
White, J. W., Chenopodium glomerulosum, 149
Whitwell, W., Euphorbia prostrata, 32; Botrychium matricariæfolium and B. lanceolatum (t. 388), 291
Williams, F. N., Primary Characters in Cerastium, 8; Critical Notes on Cerastium, 341, 382; Dianthus gallicus, 493; Cerastium arcticum, 493
Wilms's Transvaal Plants, 111
Wood's (J. M.) Natal Plants, 327
Wootonia, 236

Zahlbruckner, A., Nomenclature Note, 492
Zygnema Heydrichii, 330

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